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POWER

FRED R. LOW, *Editor*

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The Chicago Power Show

EXHIBITIONS serve a good purpose and are useful in many ways.

To a man who is interested in motor boats, for example, the Motor Boat Show affords an evening of absorbing interest. He meets there other enthusiastic boatmen, he sees the latest models and all sorts of interesting accessories and appliances.

It affords an opportunity for producers to show their wares, and especially for the inventor or promoter of a new idea or device to present it for public attention.

Some subjects are of enough general interest to warrant exhibitions every year and in many different cities. In most of such instances the mass of the exhibits are furnished by producers or sales agents in the immediate district.

Exhibitions like the Power Shows, however, draw for their exhibits upon the whole industry, and representation at a considerable number of them in any one year becomes a burden upon the manufacturers involved.

It may be argued that if the exhibitions are so widely separated geographically, there is little duplication in the attendance, representation at one should be as profitable as at another, and the benefit of exhibiting at one may be multiplied by exhibiting at all.

The results in publicity and the creation of good will are not, however, confined to the attendance, and many habitual exhibitors would be glad to see the number of such demands upon them reduced.

In compliance with this sentiment and with the obvious desire of many participants that the New York and Chicago shows should be held on alternate years, the Chicago managers have gracefully decided to hold their expositions biennially hereafter.

The result has been that many regular exhibitors withheld their patronage from the December show in New York and are exhibiting at Chicago this week. The present show comprises, therefore, a more representative display of the larger primary power apparatus, the absence of which in New York was made up by accessory and less specifically power appliances.

The Chicago Show is held simultaneously with Power Sessions of the Chicago Section of the American Society of Mechanical Engineers, which, as before, will be sponsored by the local sections and regional divisions of the following societies: American Institute of Electrical Engineers, American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Heating and Ventilating Engineers, American Society of Refrigerating Engineers, National Electric Light Association, Western Society of Engineers and the National Safety Council.

An interesting program has been prepared as detailed in previous issues, and the outlook promises a success for both Exposition and meetings equal to if not exceeding that of former years.

F. R. Low

Equipment Review

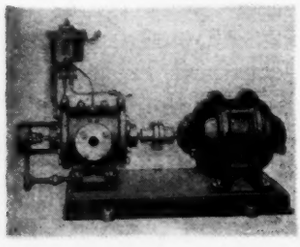
THIS NUMBER of *Power* is devoted to a review of new equipment in the field of power generation, application and allied services. It is a résumé, in somewhat condensed form, of all equipment described from Jan. 1, 1928, to Feb. 1, 1929, references to the original description being placed at the end of each item. The subjects are grouped in accordance with their functional uses, and these groups are presented alphabetically.

The aim in compiling this number has been to provide a convenient reference that will enable the reader to keep abreast of improvements in design evolved to meet advances in practice. Reader reactions to the idea and constructive suggestions as to fulfillment of its purpose will be welcomed.

Air Compressors and Air Filters

Rotary Air Compressor

As this compressor is of the multi-vane type, the discharge of air from it is free from pulsation. Air-cooled casings are furnished for low-pressure continuous-duty machines and for intermittent service at somewhat

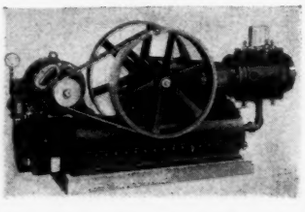


higher pressures. The unit shown is a water-jacketed compressor for the higher pressures with a centrifugal cooling-water circulating pump directly connected to an extension of the rotor shaft. Standard machines are provided with the usual openings for circulating water from the city supply and without a water-circulating pump.

The compressor is built without stuffing boxes, a seal around the shaft being obtained by means of special metal packing rings. Owing to the positive displacement of air no water seal is required. The machine is adapted to air-compressor service of any kind for pressure up to 50 lb. gage. *The Yeomans Brothers Company, 1446 Dayton St., Chicago, Ill. July 10, page 73.*

Self-Contained Single-Stage Air Compressor

A self-contained air compressor in which the compressor and driving motor with starter and controls are mounted on the top of the receiver. The compressor is of the single-stage, double-acting type operating at 400 r.p.m. and having a piston displacement of 65 cu.ft. free air per minute. It is equipped with multiple-belt drive from a 10-hp. motor, air filter and automatic start and stop control with a pressure range between 85 and 125 lb. Over-all dimensions of

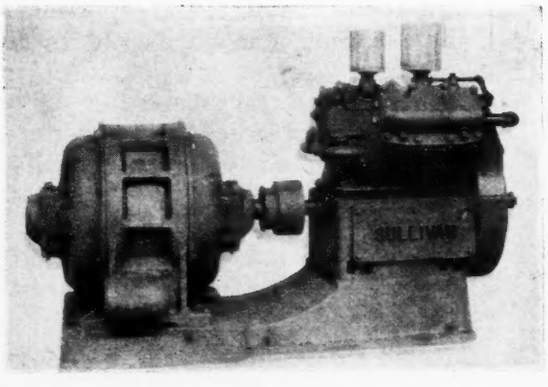


the unit are: Length, 6 ft. 6 in.; width, 2 ft. 4 in.; and the weight is 1,380 pounds.

For installations where a regular water supply is not available, the unit can be furnished with a hopper cooling tank. Units are also built with this construction in the two-stage type for pressures from 125 to 250 lb. The compressor is equipped with air-cushioned valves and all working parts are automatically lubricated. *Pennsylvania Pump & Compressor Company, Easton, Pa. June 5, page 1031.*

Small-Capacity Vertical Air Compressor

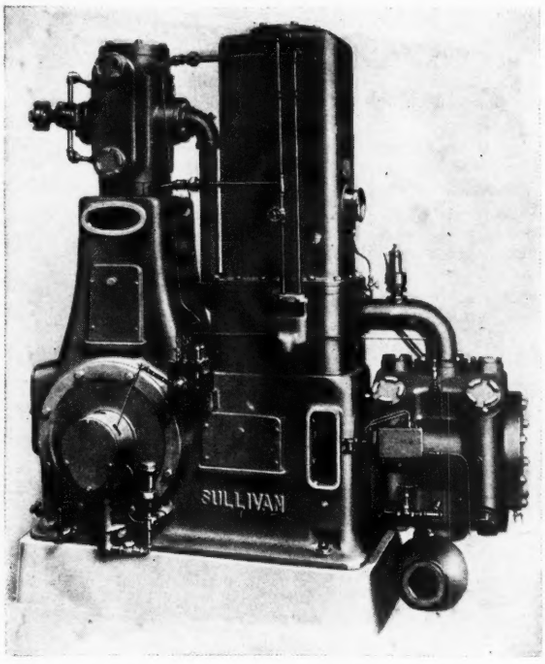
Built in two- and four-cylinder types, this line of vertical direct motor-driven air compressors is intended for small plants or shops. In the two-cylinder machine the cylinders are cast in one block bolted to the crankcase, while in the four-cylinder compressors four cylinders of proportionately smaller size are used and placed in pairs at an angle of 90 deg. with each other. The speeds of the two machines are the same, and the capacities 120 and 240 cu.ft. respectively. Direct- and alternating-current motors, together with control equipment for hand starting and stopping or for full automatic control, are available. Automatic control of the compressor cooling water also may be arranged to stop the flow of the water when the motor is at rest and to start the circulation when the motor is again placed in motion. All these compressors have automatic lubrication, wafer automatic inlet and discharge valves and automatic sweep control unloading device. *The Sullivan Machinery Company, Chicago, Ill. Jan. 10, 1928, page 77.*



Angle-Compound Compressors

A line of small and medium capacity angle-compound air compressors suitable for being direct connected to an electric motor, oil, steam or gas engine.

The main frame of the compressor is horizontal and supports the entire machine. To one end is attached the low-

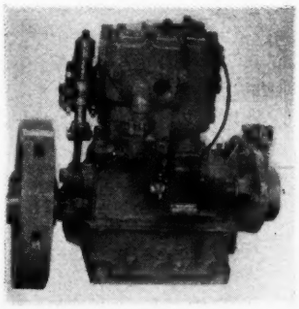


pressure cylinder, and on the other is bolted an upright pedestal that carries the vertical, or high-pressure, cylinder. The main frame is of the heavy-duty, Tangye pattern, strongly ribbed and the intercooler is unusually large. Copper for intercooler tubes is standard in all sizes. *Sullivan Machinery Company, Chicago, Ill. July 17, page 121.*

Compressors for Diesel Starting Air

Three models, specified as DE, DF and DF2, comprises a line of Diesel and high-pressure auxiliary air compressors, designed for providing starting air, emergency injection air and charging air bottles.

The units are self-contained



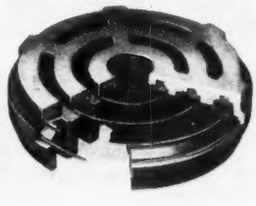
gasoline-engine-driven and are suitable for operating pressures from 250 to 1,500 lb. Both inlet and discharge valves are of the Rix plate type, which are concentric steel plates of light weight. On the two-stage machine the air from the low-pressure cylinder is passed through an intercooler, connected in the water-cooling system.

In the three models previously mentioned, the DE is a single-stage machine with a piston displacement of 12 cu.ft. at 300 lb. pressure. Corresponding figures for the single-stage model DF are 21 cu.ft. displacement, 300 lb., and the DF2 two-stage model 10 cu.ft. at 1,500 lb. In the EX type, which is adapted for direct connection to motor or engine, the diameters of the low-pressure cylinders range from 4½ to 9 in., the high-pressure cylinders from 1⅝ to 4, the piston displacement from 30 to 130 cu.ft. and the pressures from 500 to 1,500 lb. *Rix Company, Inc., 400-404 Fourth St., San Francisco, Calif. Aug. 21, page 329.*

Air-Cushioned Valve for Compressors

An important feature of this valve is the air-cushioned pocket in the guard. As the valve opens, instead of striking the guard, the disk enters this air pocket and the air trapped in the pocket provides a cushion which prevents the valve from striking the metal of the guard. Tough, tempered spring steel is used for the valve disks, which are ground flat. The valve assembly is held together by means of a retaining ring which engages the valve guard and seat.

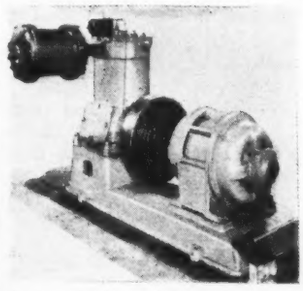
The large air ports with which



the valve is fitted permit the passage of a maximum volume of air with minimum resistance. *Pennsylvania Pump & Compressor Company, Easton, Pa. July 24, page 162.*

Air-Compressor Discharge Silencer

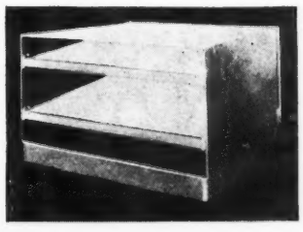
A type of silencer designed especially for use on the discharge of small high-speed air compressors. The silencer, which is designated as model D, is



designed to eliminate the discharge noise and prevent the transmission of the sound along the discharge pipe to the receiver. The casing is designed for 125 lb. per sq.in. working pressure. The silencer is particularly adaptable for use with small high-speed compressors in locations where quiet operation is essential. *Maxim Silencer Company, Hartford, Conn. Oct. 9, page 612.*

Air Filter With Cellulose Filtering Medium

The dirt collecting medium in this filter consists of a mat of many layers of fine cellulose fibers having a high absorptive capacity for liquids, the minute

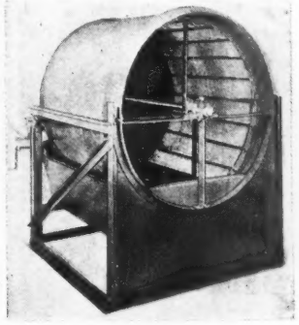


oily particles entrained in smoke or sooty air.

A single unit consists of a sheet-metal box 12 in. high, 24 in. wide and 24 in. long with a filtering capacity of 1,000 cu.ft. of air per minute. These units can be used singly, or in multiple installations of practically any capacity. The filtering material is carried between two frames of coarse wire screen hinged together on one side and opening out like a book. A simple spring clip holds the frames in position, and they may be readily removed from the unit. *The National Air Filter Company, Chicago, Ill. April 17, page 699.*

"Simplex" Air Filter

This filter, known as the "Simplex" consists of a large cylindrical drum closed at one end and carrying a filtering medium on the outside surface. The air is drawn through to the inside of the drum and then through the open end in the direction of the fan. The filtering medium comprises layers of expanded metal for precleaning and nets of heavy twisted copper ribbons of specially woven fabric for the final stage. The coarser particles of dirt are impinged on the oily surfaces of the expanded metal, and the finer particles are stopped by the copper ribbon layers. One segment of the drum is always immersed in oil. The standard unit is equipped with a hand crank for rotating the drum. If auto-

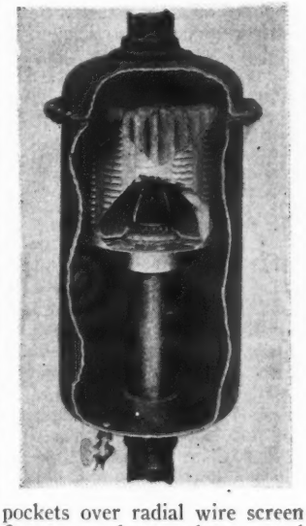


matic turning is desired, a small power unit is provided.

Standard sizes range from 800 to 40,000 cu.ft. per min., and by using additional units any capacity can be obtained. Air leakage around the drum is prevented by a flexible seal between the moving drum and the stationary outlet head. *National Air Filter Company, Chicago, Ill.. May 8, page 825.*

Filter for Compressed-Air Lines

A type of filter that can be readily inserted in the pipe line supplying air to a variety of services. The unit consists of a standard air filter inclosed in a pressed-steel housing designed to withstand a working pressure of 125 lb. The filter proper is a felt filter medium formed in



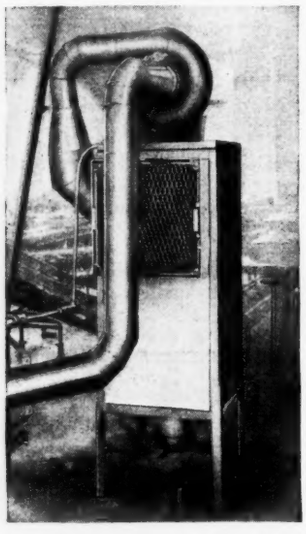
pockets over radial wire screen fins grouped around a central outlet. The large-capacity inserts are designed to pass 250

cu.ft. of free air per minute and contain 20 sq.ft. of felt within a volume slightly smaller than a cubic foot.

By closing a valve to shut off the air going into the filter housing and opening the drain cock, the air in the outlet pipes or hose is blown back through the filter proper, removing a large portion of the material on the filter surface. *Staynew Filter Corporation, Rochester, N. Y. July 17, page 120.*

Air Filter for Use in Grinding Operations

An adaptation of an air filter for cleaning the air discharged from all kinds of metal-grinding, buffing and polishing machines. The filter section is incorporated in an airtight housing built of

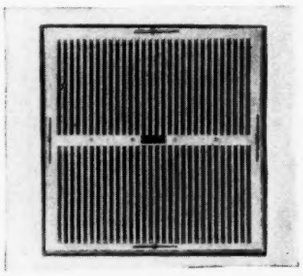


structural steel and sheet iron. The dust-laden air from the machine is drawn by a fan and discharged to the filter chamber, from which it passes into the room again through the filter. The housing is sufficiently large to cause a slowing down or expansion of the air upon reaching the chamber, and this change causes the heavy particles to fall to the bottom, the finer particles being caught in the filter. *Midwest Air Filter Company, Bradford, Pa. Aug. 28, page 366.*

Standard Panel Filter Units

A type of filter designed for filtering large volumes of air for building ventilation and other services. The filter panel consists of two pressed-steel or aluminum frames which support a series of hollow fins or pockets formed of wire cloth and arranged in two rows. Each row of fins is covered with a single piece of an extremely fine-texture material.

The filter can be cleaned by a special air suction cleaner by placing a special nozzle over the face of the panel where the openings into the sockets are



located. The filter and frame assembled make a unit 20 in. square by 6⅝ in. thick, having a capacity of 800 cu.ft. per minute. *Staynew Filter Corporation, 95 North Water Street, Rochester, N. Y. July 31, page 207.*

Cartridge Air Filters

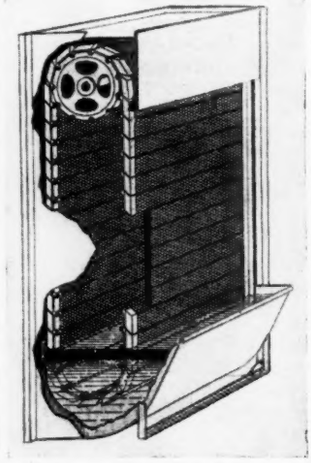
A simple and convenient filter for cleaning the air for small compressors built in capacities from 150 to 800 cu.ft. of air per minute. These filters are simply small drums with the entire circumference covered with the filtering medium, comprising layers of expanded metal

and of twisted copper ribbon of woven fabric, the whole being immersed in oil before attaching to the pipe. The cartridge is readily cleaned by placing it in a steam jet or in hot water, finally immersing it in oil before replacing on the pipe. *The National Air Filter Corporation, Chicago, Ill. May 29, page 995.*

Double-Pass Air Filter

In this air filter, known as the "TooPas," the air is filtered twice in the same unit.

The filtering medium is the endless-curtain type, having



small units of multiple layers of woven copper ribbon and expanded metal passing over large supporting wheels at the top and through an oil-cleaning bath at the bottom. The whole curtain is encased in a sheet-metal frame, 28 in. wide, 18 in. deep, and in various heights, depending upon the opening desired.

As the dirt accumulates in the oil bath, a sludge is formed which can be scraped out through an opening in the front without disturbing the oil. *National Air Filter Company, Chicago, Ill. Aug. 14, page 287.*

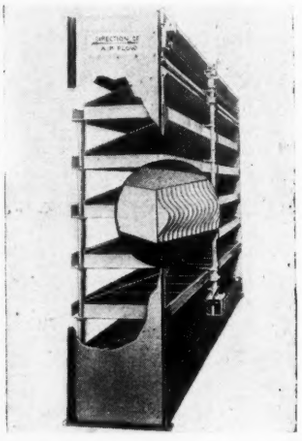
Sinuous Horizontal and Vertical Air Filters

In this air filter, which is built in both horizontal and vertical types designated as models S-H and S-V respectively, the filtering medium is a series of viscous coated curved plates.

In the horizontal type the curved plates are assembled in horizontal sections and a number of these sections are grouped in a frame and baffled to cause the air to pass upward through the sections.

In passing between these curved plates the heavier particles in the air are thrown off and retained on the surface of the plates. Cleaning of the filter and the renewing of the viscous coating on the plates is done by washing the sections, one row at a time, with viscosine. The dirty oil flows to a collecting trough at the bottom of each tier and then to a settling tank in the bottom of the frame.

In the vertical type the filtering medium is essentially the



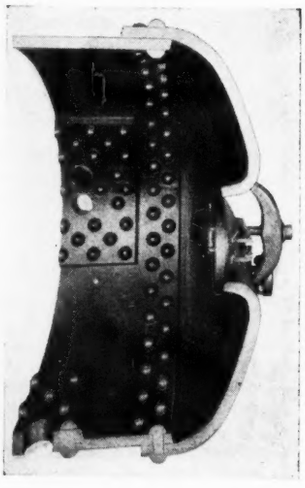
same, except that the filter cell plates are grouped in series vertically instead of horizontally. The filter cells are all made three feet wide and the cells can be grouped to give capacities from 3,000 to 240,000 cu.ft. per minute. *Midwest Air Filters, Inc., Bradford, Pa. Dec. 25, page 1054.*

Boilers, Water Walls and Air Heaters

In this section a type of steam baffles designed to improve the separation of entrained moisture in the drum, a departure in boiler drum and header construction, bare and refractory covered water walls and new and improved air heaters are described.

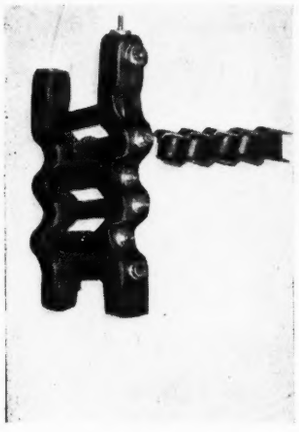
Improved Boiler Drum Construction

A departure from conventional practice in boiler-drum construction is that illustrated. This happens to be a 54 in. drum for 450 lb. steam pressure. The drum heads are put on the outside of the drum sheet instead of on the inside. The joint has machined surfaces, and this construction puts the double-butt and welded seams at the end of the drum under compression, instead of tension as is the usual practice. *Walsh & Weidner Boiler Company and Associated Interests, Combustion Engineering Corporation, New York City, Feb. 28, 1928, page 384.*



High-Pressure Sinuous Boiler Header

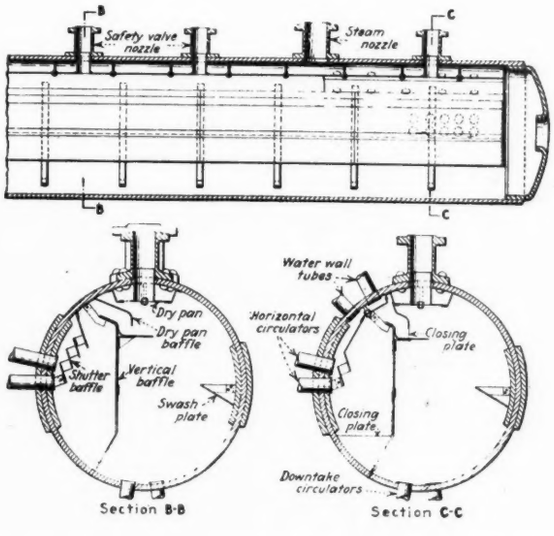
A high-pressure sinuous header with round tube hole caps on which a narrow thin gasket, which exposes only about $\frac{3}{4}$ in. of width to the pressure of the boiler, is used. This design per-



mits construction of the header with a minimum of material on account of the strengthening effect produced by the shaping of the handhole sides. The handhole plate and bolt are forged in one piece. The header illustrated is designed for 1,000 lb. working pressure. *Casey-Hedges Company and Associated Interests, Combustion Engineering Corporation, New York, Feb. 28, page 384.*

Improved Cross-Drum Boiler Steam Baffles

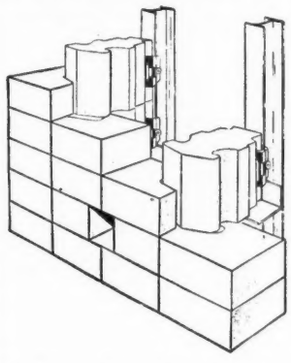
To provide for better separation of the entrained moisture from the steam in the boiler drum, the type of baffle shown has been adopted as standard on cross-drum boilers made by this company, having capacities in excess of 150,000 lb. an hour.



The fundamental change from the baffle formerly used is to substitute transverse flow for longitudinal flow of the steam in the drum. Over the steam circulators is installed a set of shutter baffles, the function of which is largely to dissipate the velocity of the incoming steam and water and to separate the larger percentage of the water from the steam. Outside of the shutter baffles is a typical vertical baffle with an inclined top portion, and above this an inclined baffle plate forming a channelway for the steam flow. A box-type drypan replaces the old-type drypipe. *Babcock & Wilcox Company, Jan. 15, 1929, page 104.*

Air-Cooled Furnace Wall Construction

In this air-cooled furnace wall the steel structure which supports the wall is designed to be



flexible rather than rigid and the refractory to be resilient rather than monolithic. The design of the wall allows the supporting beams to be readily spaced to permit location of access or ash doors, soot-blower heads, pulverized-fuel burners, etc., and also the attaching of these doors or burners rigidly to the supporting columns independent of the refractory.

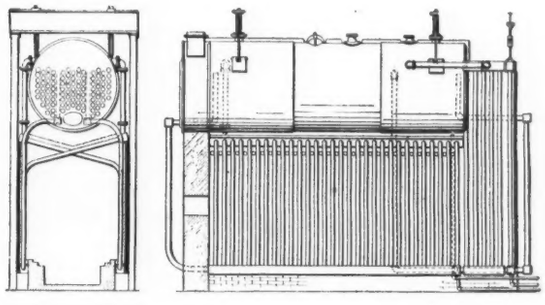
Each hanger brick is secured to the supporting column by means of a clamp and each brick holds four main wall blocks. The clamps permit a slight movement of the hanger bricks with reference to the supporting columns.

The wall is supported in horizontal sections by angle pieces or continuous angles riveted to the I-beams at points 32 or 40 in. apart. By using different I-beam spacings and different widths of brick, the design readily adapts itself to different boiler and furnace dimensions, and practically any size of opening required is readily obtained. It is also adaptable for use with water-wall tubes, the water tubes being on the inner surface of the wall.

The wall is inclosed on the outside by a covered plate of transite or other suitable material, and this outer cover forms the vertical air duct through which the air for combustion is circulated. *De Wolf Furnace Corporation, 119 Main St., East, Rochester, N. Y. Dec. 11, page 980.*

Water Wall for H.R.T. Boiler

A complete water-walled furnace and combustion chamber applied to a horizontal return-tubular type of boiler is here illustrated. The walls are backed up with T-tile insulating material to reduce radiation and a steel casing to make the setting airtight. The shell plates of the boiler are protected from the heat of the fire by a screen



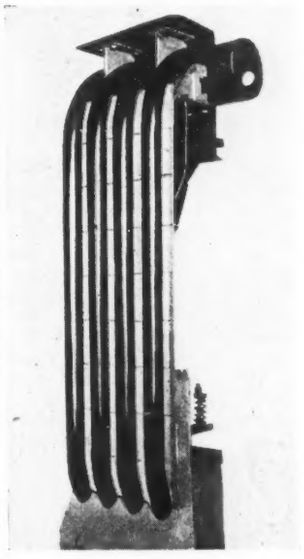
formed by carrying each side-wall tube across the furnace to the header on the opposite side and the laying on top of these tubes of a baffle wall of T-tile; see sketch.

The walls are made up of forged steel headers $\frac{9}{16}$ in. thick, joined by 4-in. vertical seamless tubes arranged on 7-in. centers, with handhole plates at the top and bottom of the tubes. Feed water is introduced in the usual way.

These boilers are available in sizes from 48 in. in diameter and 10 ft. long to 84 in. by 20 ft. and up to 41,500 lb. of steam per hour maximum capacity. *Nuway Boiler & Engineering Company, 333 North Michigan Ave., Chicago, Ill. May 8, page 823.*

Improved Foster Water Wall

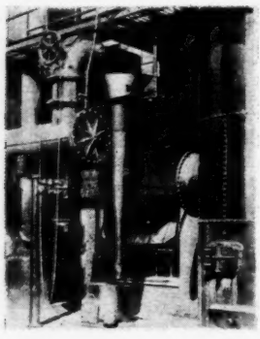
In this improved Foster water wall the tubes are left bare on the front, and wing castings are bolted on the backs of the tubes.



These castings or blocks serve to increase materially the heat absorption on the back surface of the tube. They also serve to close the spacing between the tubes and to give a complete heat absorbing surface exposed to the radiant heat of the furnace. This construction can be furnished in a number of tube sizes and tube spacings. *Foster Wheeler Corporation, 165 Broadway, New York City. Feb. 28, page 384.*

Sirocco Type D Flue Dust Collector

This collector, although primarily designed for use in pulverized-fuel fired installations to separate the ash particles from the boiler gases, is applicable to other uses. It consists of a main casing of volute shape into which the dust-laden air or gas enters tangentially. Beneath the volute is a series of alternating truncated cones and cylinders which terminate in a dust outlet at the bottom. In passing



through the collector the heavy particles are forced outward by centrifugal action and are carried downward, partly by gravity and partly by the conical formation to the dust outlet.

This dust collector may be located on the roof or any convenient location between the boiler and the induced draft fan. It is made in a number of sizes to suit practically any installation required. *American Blower Corporation, Detroit, Mich. Feb. 28, page 387.*

Improved Motor-Operated Soot Blower

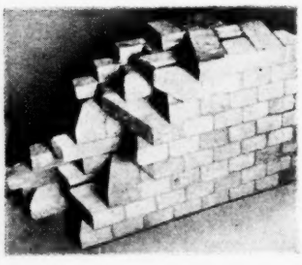
This improved motor-operated soot blower is adaptable for installation as a single unit or as a part of a complete electrically operated system comprising a number of elements. The complete system includes an electrically operated main-line steam

valve, a number of motor-driven heads and a master controller for controlling the operation of the valve and the blower heads. The blower heads are arranged to operate in the proper sequence automatically when the power is applied. An automatic drain valve is connected to the end of the steam header from which the branches are led to the individual units. The valve is off the header and automatically closes when the pressure remains open when the pressure is turned on. The improved unit illustrated embodies the standard Diamond head with the motor and control added to operate it. *Diamond Power Specialty Corporation, Detroit, Mich. Feb. 28, page 388.*

"Biasbrix" Furnace Wall Construction

This refractory, known as "Biasbrix," is designed to overcome the difficulty of making brick stay put and the tendency for walls to loosen up and joints to open. The bricks are laid up on the bias, one brick overlapping and tying together three other bricks in self-locking construction.

Although different in shape, "Biasbrix" can be laid as read-



ily as the ordinary straight brick in any thickness of wall from 4½ to 27 in. or more. They are particularly suited for hollow wall construction, where a strong bond is of importance. *General Refractories Company, Philadelphia, Pa. Feb. 7, page 266.*

Furnace Arch Block Hanger

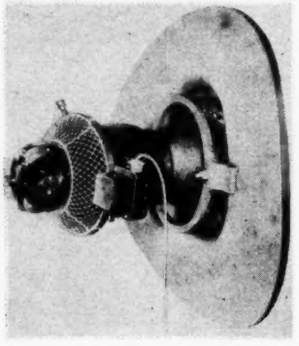
This hanger, which consists simply of a Y-casting with two hinged fingers that fit over the lower flange of an I-beam, is designed to facilitate the installation of furnace arch blocks from the inside of the furnace.

To put a new block in place, the hanger is inserted in the block and the whole pushed upward until the ends of the hinged fingers pass the lower flange of the I-beam and automatically fall into position. Removal of the hanger is also a simple procedure. The hangers are made in various lengths to suit installation requirements. *The M. A. Hofft Company, Indianapolis, Ind. Jan. 24, page 159.*

Manhole Blower

This blower is an adaptation of the "Coppus Heat Killer," designed for protecting workers in boiler rooms, steel mills, and other plants where excessive heat is encountered.

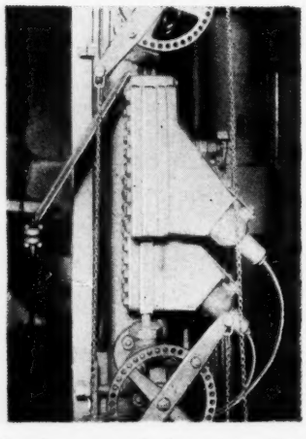
The unit shown is fitted with a special manhead and yoke by which it is readily attached to the boiler manhole. The universal motor used to drive the blower can be used with direct



or alternating current of any frequency, and 110 or 220 volts. The total weight of the unit, manhead and yoke included, is 65 pounds. *Coppus Engineering Corporation, Worcester, Mass. June 12, page 1069.*

Illuminator for Flat-Type Gage Glasses

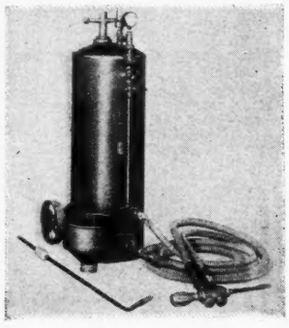
This water column illuminator is adaptable to single and multiple flat gage glasses as now used on high-pressure boilers, consisting of thick flat plates of glass bolted into heavy castings. A round glass illuminator with condenser lens and special air cleaning jets is surrounded by a special casing which supports the illuminator



in the rear of the gage glass and which is designed to prevent a light from passing anywhere but through the glass. The light is thrown upward at an angle at the rear of the glass, and this produces a reflection from the underside of the water surface, or meniscus. The type D unit shown in the illustration is adaptable to either single or multiple flat gage mounting. *National Company, Boston, Mass. Nov. 6, page 773.*

Esso Refractory Gun

Ability to mix its own material mechanically, operate on air pressures as low as 30 lb., be operated by one man, and to spray twenty gallons with one filling, are some of the features of this gun, designed for spraying refractories. Two interchangeable nozzles — one short one for places easily reached and a long one for more difficult locations—are furnished. By

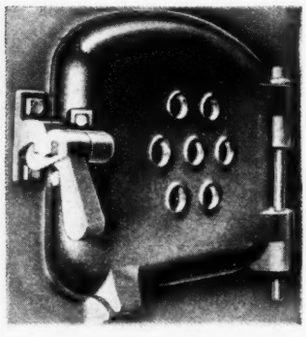


varying the amount of air and material, the density of the spray is readily controlled.

A large funnel with a removable 16-mesh screen is supplied for charging the machine. *S. Obermayer Company, Chicago, Ill. May 15, page 870.*

Safety Latch for Furnace Doors

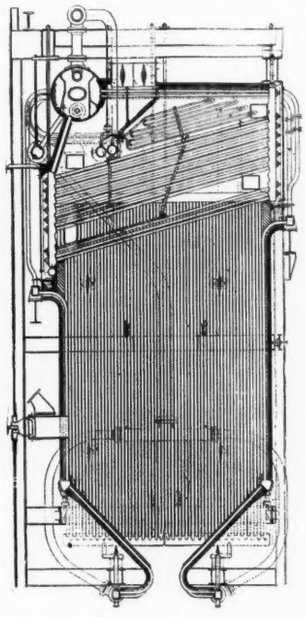
An improved safety latch for furnace firing doors, designed to conform to the requirements of any State Inspection Department. The latch is hinged on the door with a stop so placed as to limit the throw of it in either direction. In opening the door the counterweight is raised until the latch strikes the stop; this releases the catch, and the counterweight then serves as a handle for opening the door. The stop also limits the throw



of the counterweight in the other direction, so that the door will latch automatically when pushed shut. *Erie City Iron Works, Erie, Pa. April 3, page 615.*

Springfield Water Walls

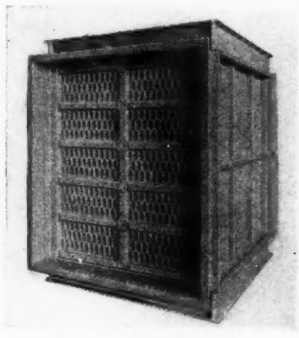
The water wall shown embodies, as far as possible, the same materials and methods of construction as employed in the manufacture of the water-tube boilers put out by this company.



The walls are built in sections or panels whenever possible, and assembled and tested in the shop and shipped as a complete unit. Walls with wide tube spacing or with the tubes so closely spaced that they actually touch, and designed for the various boiler pressures in use, are available. The unit shown is designed to operate at 500 lb. working pressure. *Springfield Boiler Company, Springfield, Ill. Jan. 8, 1929, page 68.*

Oval Tube Air Heater with Removable Tube Sections

The use of oval tubes, metal-to-metal joints without packing, and sections that are removable



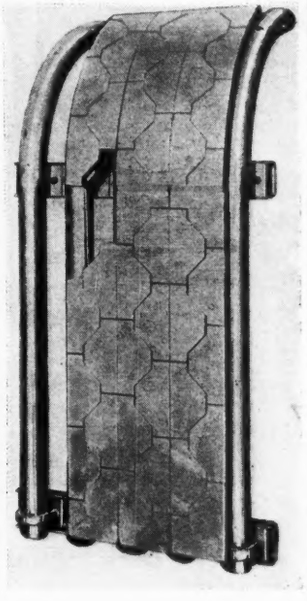
from either side without disturbing either the gas or air passages are important features of this air heater.

In the heating elements the oval tubes are welded in steel-plate headers. The elements are made in four header sizes, of ten different lengths each, providing a wide range in heater dimensions and capacities.

Each section is readily withdrawn from the side by removing the outer casing. The sections slide on guide rails at each end. They are locked in position and sealed gas-tight by clamping the flanged lip on the headers to a rounded surface on the guide rail by means of bolted clamps. Provision is made for expansion, longitudinally by a floating head in one end of the main frame. *Shaw-Perkins Manufacturing Company, Pittsburgh, Pa. Jan. 22, 1929, page 143.*

Nygaard Furnace Water Wall

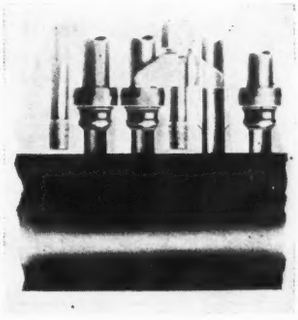
A unique locking arrangement on the refractory blocks which permits renewal from the



fire side, elimination of metal clamps and large contact area between the blocks and tubes, are the important features of this water wall.

The blocks are made to fit the tubes on the sides rather than on the face next to fire, and have projections which interlock one with the other, as well as tapered surfaces which tend to force the blocks against the tubes and give intimate contact with the tubes. Clearances are provided between the blocks horizontally and vertically, and every block can be renewed from the fire side without removing the insulation or outer covering.

The water tubes are rigidly spaced by means of 4-in. channels, which also serve to support the blocks sectionally, thus facilitating the renewal or replacement of them. The blocks are made of the silicon carbide refractory "Carbofrax." The wall is put out with two tube sizes and spacings, one being 3½-in. tubes on 6-in. centers and the other 4-in. tubes on 7-in. centers. *Bernitz Furnace Appliance Company, 80 Federal St., Boston, Mass. Nov. 20, page 848.*



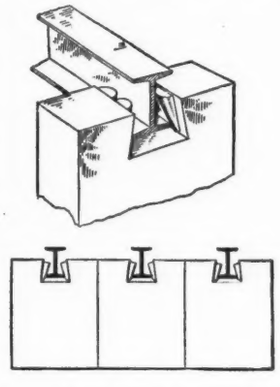
Elesco Forged Superheater Header

This superheater header is forged from a solid billet and drilled eccentrically. The tubes are connected at the thick part of the header by the standard Elesco metal-to-metal joint. The section shown is designed for a pressure of 800 lb. and a final temperature of 735 deg. Similar headers are available for higher pressures. *Superheater Company, New York City. Feb. 28, page 388.*

Suspended Furnace Arch

In this arch the blocks are suspended directly from a series of parallel I-beams by means of semicircular wedges placed between the sides of the dovetail grooves in the tile and the lower edge of the I-beam.

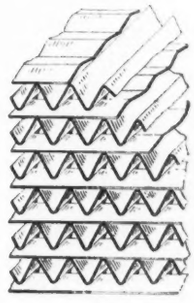
This construction facilitates the erection and removal or replacement of individual tiles, and the space required above



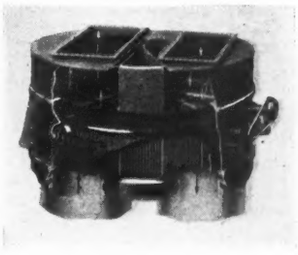
the arch for the suspension members is reduced to a minimum. To replace a tile it is only necessary to push it up sufficiently to loosen the wedges and remove them and drop the tile out of place. A new tile is readily inserted by pushing it up against the I-beam and dropping the wedges into place. *C. W. Burroughs, 303 Streatham Ave., Montreal, Canada. Jan. 17, 1928, page 120.*

Improvements in the Ljungstrom Air Preheater

The use of a new form of heating element to increase the heat transfer with a consequent reduction in the over-all size



of a unit for a given capacity is a recent improvement made to the Ljungstrom air preheater. The essential change in the heating element is the substitution of an undulating partition sheet for the former flat-type sheet. The undulations are in transverse direction to the vertical channels formed by the corrugations of the companion sheet. The increased heat transfer has permitted the use of shorter heating elements, with



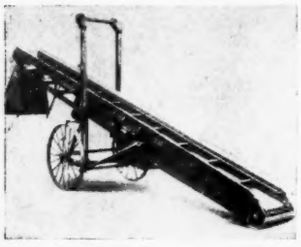
larger passages. The rotor drive has been simplified, and in some sizes of the integral-fan type a fully cooled outboard fan bearing has been substituted for the central internal bearing previously used. The connections below the rotor of the integral fan type and all connections in the independent fan type may now be located in the end or side of the housing. An additional independent fan type, with all-vertical inlet and outlet connections, is available. This makes the ducts serve as inlet and outlet chambers and reduces the overall height. *Air Preheater Corporation, 25 Broadway, New York City. Dec. 25, page 1053.*

Coal- and Ash-Handling Equipment

Refinements in mechanical construction and the adoption of anti-friction bearings wherever possible are apparent in many designs

"Drag-On Portable Scraper Conveyor

Reduced weight of frame with increased size and strength of the conveying chain is a feature on this portable conveyor. The flights of one-quarter inch steel plates are L-shaped and run the full width of the trough. The screening chute is three feet

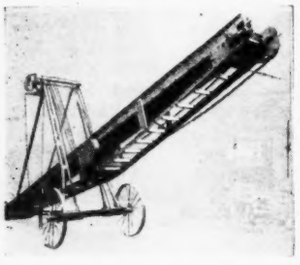


long and gives six square feet of mesh for taking the fines out of the coal while loading. The conveyor is mounted on four-foot diameter wheels swiveled to turn in either direction. Power for the conveyor is supplied by an electric motor. The discharge end of the machine is raised or lowered by means of a worm-geared winch. *Jeffrey Manufacturing Company, Columbus, Ohio. Jan. 17 page 120.*

Portable Flight Conveyor in Three Sizes

A portable flight conveyor, made in 21-, 26- and 31-ft. lengths and designed to handle all grades of coal and coke from the smallest to the largest sizes.

The conveying element, consisting of a double-strand chain



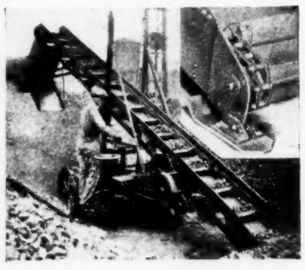
with special attachments, moves at a speed of 124 ft. per min. through a trough 24 in. wide. This gives the conveyor a capacity of 60 cu.ft., or approximately 1½ tons a minute when handling coal. The raising and lowering of the conveying element is accomplished by a chain arrangement of worm gearing and drive.

The machine may be operated in conjunction with an overhead I-beam trolley, chain block and bail. It may also be fitted with a screening chute and screens of the woven-wire or bar type. *Link-Belt Company, Chicago, Ill. Oct. 30, page 731.*

Power-Propelled Flight Conveyor

This power-propelled flight conveyor is put out in two sizes, 24 and 30 ft. long. The trough of the conveyor is 21 in. wide and 11 in. deep, and the flights are 16 in. long and 4 in. high.

Being self-propelled it is operated by one man, as all the controls are grouped at one point on the side of the conveyor. The machine is driven by a 7½-hp. 1,800-r.p.m. motor or a 9-hp. two-cylinder gasoline engine, and has a traveling speed forward or into the pile of 29,



54 and 92 ft. per min. and a reverse speed of 24 ft. per min. Traction is by means of a three-wheel truck. The traction wheels can be driven together or individually for turning. The wheels can also be swiveled when not engaged.

The machine is equally adaptable to trimming and reclaiming, as the height of the boom is readily adjustable for a range of heights. The maximum height of discharge on the 24-ft. machine is 15 ft. 10 in. and in the 30-ft. machine 17 ft. 6 in. to the center of the head shaft. *Barber-Greene Company, Aurora, Ill. June 19, page 1116.*

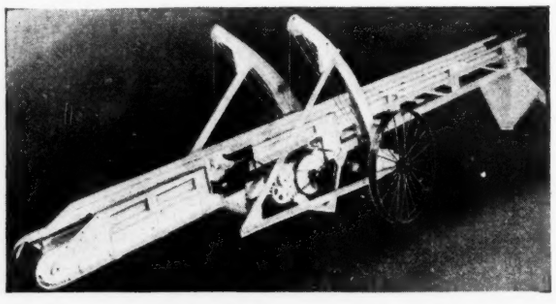
"Jax" Portable Conveyor

This portable conveyor, known as the Jax, is adaptable to a variety of uses, such as handling coal, coke, sand, etc., from cars or for loading the material into cars. It consists of an endless rubber belt running over the two pulleys mounted 12 to 15 ft. apart, on a framework. The conveyor rests on a pair of

wheels which are movable to practically any point along the frame. The wheels are also provided with a vertical adjustment for three positions. *Link-Belt Company, 910 South Michigan Ave., Chicago, Ill. Sept. 4, page 419.*

Portable Flight Conveyor for All Grades of Coal

This portable flight conveyor, which is adaptable for handling all sizes and grades of coal as well as coke and similar materials, has a handling capacity of 60 to 90 tons of coal per hour, depending on the grade and size handled. It is made in three lengths: 20, 25 and 30 ft. The flights are 15 in. wide and 4 in. high. The machine is equipped with a power raising and lowering device, which can be operated with the conveyor



in operation. Swivel wheels give added flexibility.

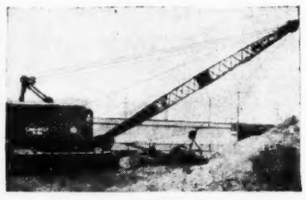
The drive mechanism and motor are placed to the rear of the center of the machine under the boom. This confines the bulk of the weight to a point close to the loading end and permits the head end to project a greater distance beyond the wheels.

Two compression clutches are provided on the drive mechanism—one for throwing the conveyor in and out of service without starting and stopping the motor, the other for operating the raising and lowering mechanism. *Gifford-Wood Company, Hudson, N. Y. May 29, page 995.*

Two-Cubic-Yard Crawler Shovel

Adaptability for use as a shovel, a dragline, a trench shovel or with a 2-cu.yd. clamshell bucket is a feature of this K-55 machine. The power source is by gasoline engine, electric motor or Diesel engine. The machine in working condition is 12 ft. wide over all at the lower frame, with crawler treads 36 in. wide.

The main friction clutch is 42 in. in diameter; the wing and tread clutches, 30 in. The 13½-in. center pin is adjustable from above and can be removed as a unit. When used as a shovel, the machine carries a



30-ft. boom and 18-ft. dipper stick, carrying a 2-cu.yd. manganese-steel dipper. The dragline boom is 59 ft. long for a 2-cu.yd. bucket, or 60 ft. long for a 1½-cu.yd. bucket. *Link-Belt Company, Chicago, Ill. Oct. 2, page 572.*

Two-Speed Gasoline Crane with Automotive Shift

Flexibility equal to that of steam cranes is claimed for this gasoline three-speed unit. It has an automotive shift that works like the transmission on an automobile; that is, low gear for a powerful start, intermediate for average crane work and traveling, and high gear for rapid traveling. The transmission is operated with a foot clutch and

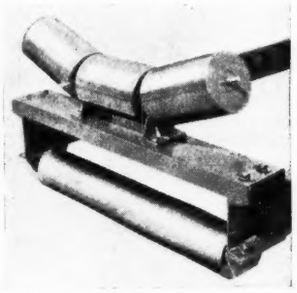
an automotive gear-shift lever placed at the front of the deck. The friction clutches are of the compound lever umbrella-action type that expand outwardly against the friction groove of the drum.

The crane is designed espe-

cially for operation with a four-cylinder gasoline engine. To minimize vibration, the engine is fitted down into the heavy revolving deck casting and is bolted solidly to it. The car body is mounted on two four-wheel swiveling trucks, and traveling power is transmitted to the axles through universal couplings and cast-steel bevel gears. Capacities range from 12 to 30 tons. *American Hoist & Derrick Company, 63 South Robert St., St. Paul, Minn. April 24, page 741.*

Belt-Conveyor Idler

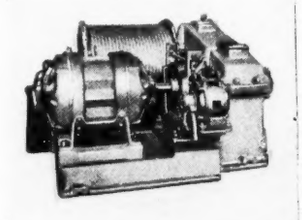
An improved ball-bearing belt-conveyor idler in which the pulleys are spaced close to prevent belt creasing and in which



the pulleys are made from heavy steel tubing with electrically welded steel heads flush with the ends to eliminate dust pockets. The unit mounting used for the pulley bearings insures alignment and provides a grease reservoir which holds sufficient lubricant for the pulley for three to six months' service. The bearings are protected from dust and grit by a quadruple labyrinth grease seal. The pulley assembly is supported by heavy cast-iron brackets suitable for mounting on either wood or channel base. It is lubricated at three points only through high-pressure fittings. *Chicago Automatic Conveyor Company, Old Colony Building, Chicago, Ill. Dec. 4, page 936.*

Skip-Hoist Winding Machine

As the winding drum in this hoist is connected to the motor by a chain of spur gears, and



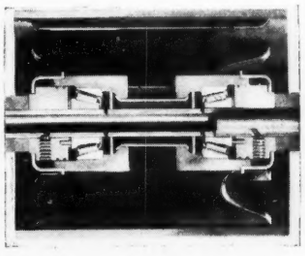
no worm gears or thrust bearings are used, the friction is reduced to a minimum.

Provision is made for direct and positive control of the skip buckets at all times without the use of track limit switches. The machine is designed for operation, with full automatic, full magnetic control, or with semi-automatic, full magnetic control, as generally used for ash-handling service. When both coal and ashes are handled by the same hoist, these two types of control are combined, so that coal may be handled continuously and ashes intermittently. Other features of the machine are: Hoist drum with machine-turned grooves; flexible couplings between motor and spur-gear drive; control equipped with overload and no-voltage release; slack cable device to throw off motor if cables become slack. *R. H. Beaumont Company, Philadelphia, Pa. Oct. 9, page 611.*

Standardized Belt Carriers

This line of carriers for belt conveyors has been standardized so that the same stands and bases can be used with any one of three types of pulleys—the plain bearing, the bronze-bushed and the roller bearing, as illustrated.

The pulleys are made with open ends, and arms and ribs are used to join the hub and

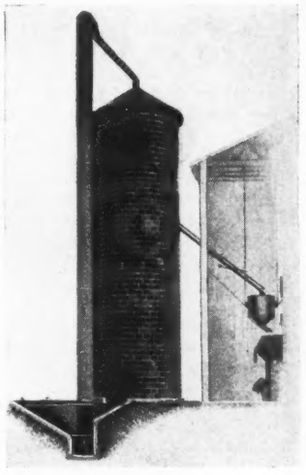


roll. The gray iron of which the pulleys are made contains considerable free carbon, which acts as a rust repellant. The pulleys with plain or bronze-bushed bearings, have hubs especially cored out to form large recessed grease pockets connecting with a pressure lubrication fitted at the end of the hollow shaft.

In the roller-bearing pulley the labyrinth seal prevents dirt or abrasives from reaching the bearings. *Jeffrey Manufacturing Company, Columbus, Ohio. July 10, page 74.*

B-G Industrial Silos for Coal Storage

An arrangement of tile silo, motor-driven bucket elevator and track hopper that will automatically transfer coal from the railroad car to the stoker, place it in storage and reclaim it when needed without any manual labor. From the track hopper the coal slides into the boot of

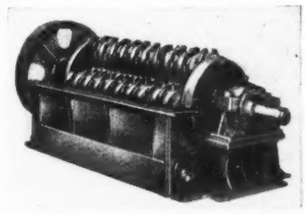


the elevator by which it is elevated and discharged through the top of the silo into a live storage bin formed by a sloping baffle built up from the boiler-room side of the silo, but not quite reaching the opposite side. The coal from the live storage flows to the weigh larry, stoker hopper, etc., and when this storage space becomes full the coal flows over the end of the baffle into the main body of the silo.

These silos are made in sizes ranging from 200 to 500 tons capacity. For immediate use the live storage bunker at the top will hold 50 to 75 tons. The silo is made of hollow hard-burned unglazed clay tile curved to the proper radius. The tile wall is five inches thick, and on the inner surface is a dovetailed corrugation to hold cement lining. On the top and bottom of each tile are three-quarter-inch grooves in which are placed the steel bands that resist the lateral pressure. *B-G Construction Company, Berne, Ind. April 17, page 698.*

Improved Ring Coal Crusher

In this line of crushers, which is designated as the S series, the machines are of cast-steel construction with manganese grinding parts and an alloy steel shaft of liberal diameter. The shaft is carried in tapered-roller bearings mounted on heavily

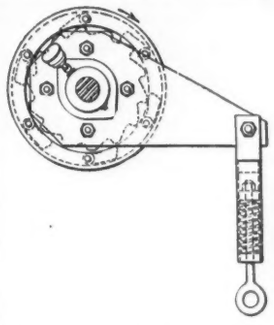


ribbed end castings. Adjustment for the size of product desired is made by means of an eccentric grinding plate. The line is made in a number of sizes. *The American Pulverizer Company, 1249 Macklind Ave., St. Louis, Mo. May 29, page 995.*

Ratchet Safety Lock

When used on elevators, pivoted-bucket carriers, belt conveyors and similar equipment, this safety lock provides protection against back running or reversal of travel when an unexpected interruption of power occurs.

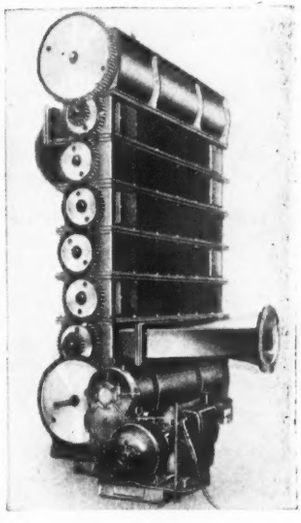
One of six pawls grouped around the ratchet is always in position to grip a ratchet tooth. The housing is bolted to the countershaft and turns with it when the power is on. The pawls are spaced so that the maximum backward motion is



less than one inch on the largest elevator. *Jeffrey Manufacturing Company, Columbus, Ohio. May 22, page 922.*

Cascading Coal Drier

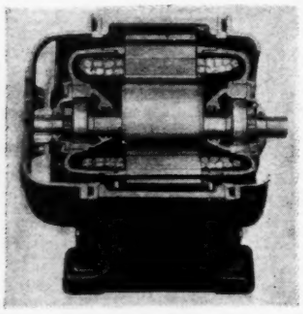
A cascading type of coal drier consisting of a series of superimposed rotating troughs. In passing downward through the



drier, the coal meets an upward current of hot gases drawn through the machine by means of a fan at the outlet end. The troughs or retarders revolve in opposite directions, and the design is such that as coal is discharged from one retarder, the one directly below it is in the correct position to receive it. The speed of rotation depends upon the degree of dryness required in the outgoing product. *Universal Dryers Company, Ltd., Queens Road, Barnsley, Yorkshire, England. Aug. 14, page 286.*

Totally Inclosed Ventilated Motor

In this completely inclosed ventilated ball-bearing motor with a 40-deg. rating, cooling of the winding is obtained with

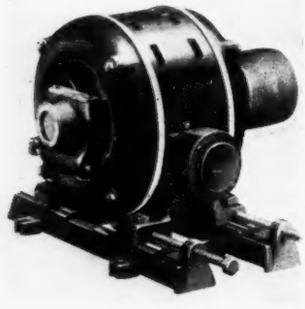


an external fan which causes air to flow over the end bells and stator laminations. The stator core is perforated to facilitate the cooling.

The stator is removable and can be replaced readily in case of damage. The stator windings are treated with a special oil- and acid-proof varnish. The rotor is of the usual construction. The end rings are electrically welded to the bars and form a one-piece squirrel cage of uniform material. *American Electric Motor Company, Cedarsburg, Wis. April 10, page 655.*

Condenser Starting Single-Phase Motor

In this line of single-phase motors starting is obtained by a static condenser connected permanently across the winding. This condenser acts during starting to give the necessary torque and improves the power factor of the motor when in operation. The motor is of the condenser type and in construction is similar to the squirrel-cage polyphase type. In the stator are two groups of windings as in a two-phase motor. The rotor is of the simple squirrel-cage type without commutator. The two stator windings are left in circuit continuously as long as the motor is connected to the line. The starting torque of these motors can be made comparable with that of the polyphase type.



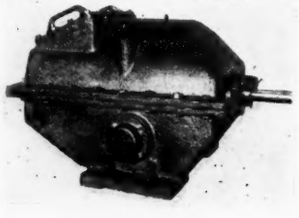
The motors are built for a range of speed from 3,600 to 300 r.p.m. and in sizes up to 30 hp. They are particularly adapted to slow speed, since the condensers correct the inherently low power factor of the slow speed type machine. They are built with either sleeve or tapered roller bearings and can be obtained in either the vertical shaft or the horizontal shaft type. *Howell Electric Motors Company, Howell, Mich. July 3, page 31.*

Electrical Equipment and Motors

Totally inclosed, air-cooled; across-the-line starting; and explosion-proof motors. Improved circuit breakers and automatic starters with thermal over-load protection characterize recent developments in electrical equipment.

Motors for Use in Explosive Atmosphere

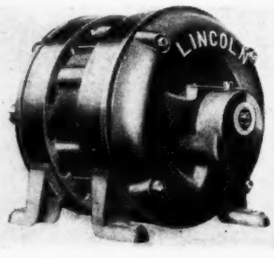
This line of motors in both alternating and direct-current types is built for application where explosive gases, fumes or dust is present. The object of the special construction is to reduce the dangers that heat generated inside the apparatus from any cause whatever will be transmitted to the outside in such intensity as to ignite the gases surrounding the equipment. A two-piece cast-iron exterior is provided, heavy enough to withstand the pressures of an internal explosion.



The electrical characteristics are primarily the same as those of standard totally inclosed motors. The alternating-current motors are available in single-phase ratings up to 3 hp. and in polyphase ratings up to 15 hp. at standard voltages and speeds. Direct-current motors in both shunt and compound types with horsepower ratings from $\frac{3}{4}$ to 5 at the standard speeds and voltages are also available. The motors are designed to operate within a temperature rise of 55 deg. C. the standard for inclosed motors. *General Electric Co., Schenectady, N. Y. June 12, page 1070.*

Induction Motors for Across-the-Line Starting

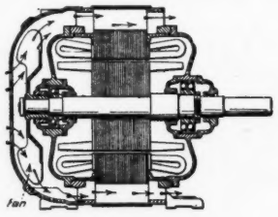
These motors are designed to be started directly across the line without the use of a starting compensator, starting resistance or other voltage-reducing device. Power factor, efficiency, maximum torque, temperature rise, etc., however, have not been sacrificed in order to insure low starting current. Tests show that starting torques of from full load to better than 250 per cent of full load, depending on the horsepower and speed, are possible without exceeding the standard requirement as to starting current. The motors are



built in sizes from $\frac{1}{2}$ to 30 hp. and for either two- or three-phase, 60 cycles. The temperature rise of the motors under continuous full load is low owing to the electrical design and also to the welded steel construction, which permits free circulation of air. The motors are normally equipped with sleeve bearings, but ball bearings can be had if desired. The motor is claimed to have a high pull-out torque which is of considerable importance in that the motor will not stall on sudden overloads. *The Lincoln Electric Company, Cleveland, Ohio. Jan. 17, page 119.*

Air-Jacketed Motor

In this motor which is designed expressly for use where dust, fumes and moisture are present, the frame housing, motor proper and all bearings are substantially airtight. The internal motor is surrounded by a jacket open at both ends with a fan mounted on the shaft extension between the motor and outer casing. The motor proper is of standard construction. The stator laminae are welded together to lessen vibration and

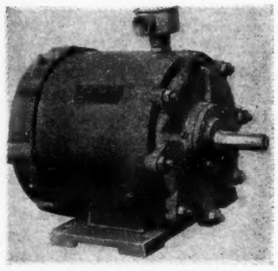


reduce magnetic noises. The motor is fitted with double row ball bearings, self-aligning in one end plate and deep grooved in the other to take the end thrust.

Single-phase repulsion-induction motors are available in sizes from 1 to 20 hp. and polyphase squirrel-cage motors in sizes from 2 to 30 hp. All motors are designed for a temperature rise of 50 deg. C. *Wagner Electric Corporation, St. Louis, Mo. April 10, page 657.*

Explosive-Proof Self-Ventilated Motor

This explosive-proof self-ventilated motor designed for use where explosive mixtures or fumes of gasoline, naphtha, acetone and alcohol are present, is available in sizes up to 5 hp. The motors are only slightly larger than the standard unit of the same horsepower and are of comparatively light weight,

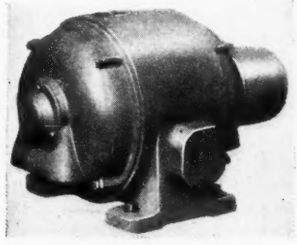


weighing but slightly more than open-type motors of equal ratings. *Louis Allis Company, Milwaukee, Wis. Aug. 28, page 367.*

Cross-Line Totally Inclosed Motors

Totally inclosed with interchangeable voltage connections so that the motor is readily connected for 220 or 440 volts as desired, is a feature of these motors, which are designed for across-the-line starting by means of push-button control. The motors are of one-piece frame construction with cast rotors

and are designed for low temperature rise and with generous overload capacity. They are mounted on either ball or roller bearings as desired in sizes from ¼ to 30 hp. for three-phase application. Single-phase machines are built in sizes from 1 to 5

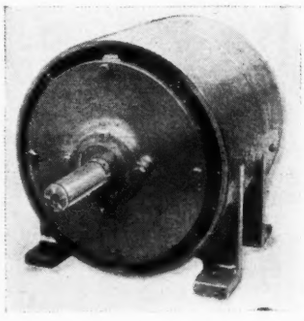


hp. and for various speeds. They can be used as totally inclosed, totally inclosed pipe ventilated, or totally inclosed ventilated. *Sterling Electric Motors, Inc., Los Angeles, Calif. May 15, page 871.*

Totally Inclosed Fan-Cooled Motor

In a type of fan-cooled motor, designed to meet severe operating conditions, the inner shell containing the windings is totally inclosed. The inner shell is mounted in the outer one, so as to allow a free air space between them. One end cover of the outer shell is provided with holes for admitting air between the outer and inner shells.

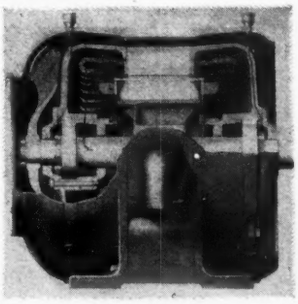
A fan mounted in the space between the inner and outer end covers draws a current of air through the holes and blows it



over the surface of the inner shell. This type of motor permits practically the same rating for a given frame size as an open-type motor. *Cleveland Electric Motor Company, Cleveland, Ohio. Sept. 4, page 420.*

Inclosed Fan-Cooled Motor

A line of inclosed fan-cooled motors includes sizes from 1 to 50 hp. A fan suitable for either direction of rotation is mounted on the end of the shaft outside the bearing and a medium-mesh screen covers the air inlet. A circumferential jacket controls the path of cooling air.

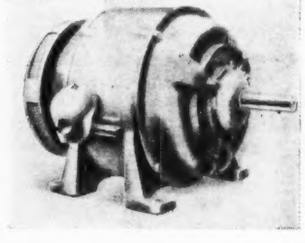


Solid cast-iron bearing housings are attached to the stator end heads with a machined fit. Internal parts of the motor are readily accessible by removal of housings. Temperature rise is within 55 deg. C. measured by the resistance method. *Allis-Chalmers Manufacturing Company, Milwaukee, Wis. Sept. 25, page 535.*

Air-Cooled Skeleton-Frame Induction Motor

A radiating bonnet is used on this motor to inclose completely the stator, independently of the outer casing. The construction provides a tight and stationary seal and protects the air gap between the stator and the rotor from dirt and dust. The bearings are also inclosed to protect them from dust.

Cooling air is drawn through openings at the center of the coupling end bearing bracket, passed over the radiating bonnet and exhausted by a large-diameter fan on the outer end of the shaft. The electrical and oper-

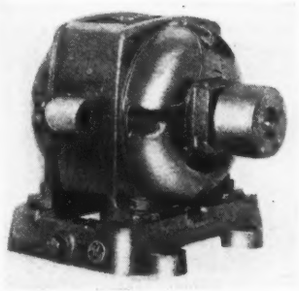


ating characteristics of this motor are the same as those of the open type. Sizes range from 1½ to 40 hp. for operation on 220, 440 and 550 volts, two- or three-phase 60-cycle circuits. *Reliance Electric & Engineering Company, Ivanhoe Road, Cleveland, Ohio. Nov. 13, page 810.*

Single-Phase Motor

More efficient use of the stator punchings is a feature of this improved single-phase repulsion induction motor, made in ¾-, 1-, 1½- and 2-hp. sizes and intended to supplement the present line of SCR motors. It is of the constant-speed, high-starting-torque type for general application.

The motor is inclosed except for ventilating openings in the lower portion of each end shield. Air is drawn through the ventilating openings at the pulley end by means of an internal fan, passes around the stator laminations and out through the



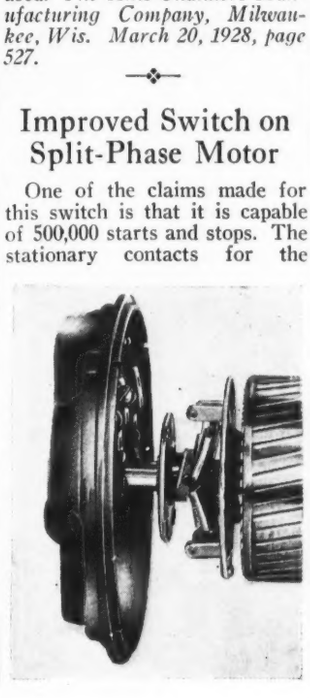
commutator - end ventilating openings. This construction makes a practically inclosed motor and provides protection against falling particles and splashing water. With only a slight change the motor may be totally inclosed, at a somewhat reduced rating. *General Electric Company, Schenectady, N. Y. Oct. 9, page 611.*

Line-Start Induction Motors

A line of squirrel-cage induction motors suitable for starting on full-line voltage. These motors are normal-torque, high-reactance machines and will not draw starting current in excess of the standard limits. They are built in sizes from 7½ to 30 hp., 600 to 3,600 r.p.m. for 110, 220 and 440 volts, and can be had with either sleeve or roller bearings. A magnetic switch with push-button control is the only starting equipment used. *The Allis-Chalmers Manufacturing Company, Milwaukee, Wis. March 20, 1928, page 527.*

Improved Switch on Split-Phase Motor

One of the claims made for this switch is that it is capable of 500,000 starts and stops. The stationary contacts for the



starting-winding circuits are made of a bronze strip formed in such a way as to produce a spring tension on a brass contact ring when the motor is running at nearly full speed. When the motor is not running, this ring is held in against the contacts by the governor spring. Both the contact ring and the stationary contacts are mounted on bakelite. When the rotor comes up to speed, centrifugal force causes the weights to pull the contact ring away from the stationary contacts to open the starting winding.

The governor moving parts are carried by a zinc-plated collar that rides freely on the shaft. The switch is so constructed as to give a wiping contact and to open the circuit with a quick break. *The Wagner Electric Corporation, St. Louis, Mo. March 13, page 483.*

Commutator Stones

Double - duty commutator stones for touching up commutator and slip rings. One end of the stone is a coarse (cutting) grade and the other end

a fine (finishing) grade. The stones are available in various sizes convenient for carrying in the pocket or tool kit. *The Martindale Electric Company, 1260 West Fourth Street, Cleveland, Ohio. April 10, page 657.*

Combination Grinding and Turning Tool

This combination rest can be mounted on a brush-holder stud for supporting a grinding stone or a lathe tool. For grinding, the tool holder is removed from the rest and the grinding stones mounted in its place. With this tool any ridges next to the risers on the commutator can be removed with a lathe tool, then a grinding stone used to true the surface of the commutator. *Martindale Electric Company, Cleveland, Ohio. April 10, page 655.*

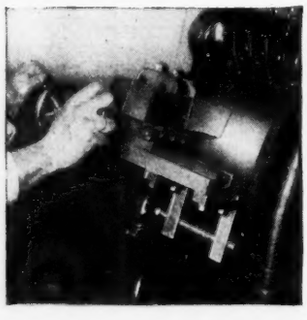
Commutator-Mica Undercutter

The cutter in this tool is driven by a worm and gear connected to a motor through a long flexible shaft. The tool is so constructed that it is not necessary to remove any of the brushes when undercutting the

commutator, as it can be operated in a space three inches wide. The slotter can be used on large or small commutators and will slot to within about one-quarter inch of the risers. A one-quarter-horsepower alternating-current or a direct-current motor is supplied to do the driving. For alternating current the motors may be had for 110 or 220 volts 60 cycles, and on direct-current for 115 or 230 volts. *Ideal Commutator Dresser Company, Sycamore, Ill. Aug. 28, page 366.*

Commutator Tool Rest

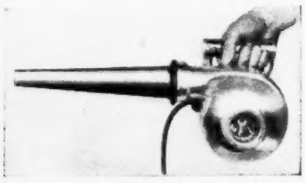
This rest is simple in construction and light enough to be easily portable. Bases are available in lengths from 6 to 28 in. varying by two inches. Bases 14 in. or smaller have two supports, while those 16 in. or longer have three supports. The supports are L-shaped either



two or three inches high or T-shaped three inches high for attaching to round brush arms. Flat supports can be substituted when necessary to attach to flat brush arms. Each base is fitted with a large-diameter wheel to facilitate easy operation of the cross-feed; also a screw in-feed adjustment. The machine is designed to take a 2x2-in. face cutting stone or smaller of any length. *Ideal Commutator Dresser Company, Sycamore, Ill. Oct. 23, page 689.*

Blower and Vacuum Cleaner

This device is adapted to blowing the dust out of machines, or a dust bag may be attached and the blower used as a vacuum cleaner. The special attachments allow cleaning in



confined places and on all kinds of surfaces. The blower may also be used for spraying application, such as varnish on electric machine windings. Another combination is in conjunction with an electric heating unit for blowing heated air for drying purposes. Operation is on power that can be taken from any convenient lamp socket or outlet. *Ideal Commutator Dresser Company, Sycamore, Ill. June 26, 1928, page 1157.*

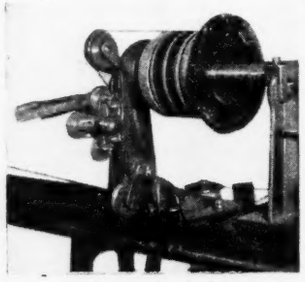
Across-the-Line Starter for A.-C. Motors

These starters provide low voltage and either magnetic or thermal overload protection. They can be used on any type of alternating-current motor, suitable for across-the-line starting. They are furnished in three types. Type A has a start and a stop push button mounted in the cover. Type B is furnished without push but-

ton and is generally used where two-wire control is required together with automatic devices such as pressure switches, float switches, etc. Type C has a three-point two-way switch mounted in the cover, which provides either manual or automatic control. It is generally used with automatic devices such as float switches, pressure switches, thermostats, etc. *Industrial Controller Company, Milwaukee, Wis. Sept. 25, page 533.*

Binding-Wire Tension Indicator for Repairing Motor Armatures

The exact strain or tension in pounds applied to the steel binding wire by the binding machine or lathe is indicated by this device. It also provides a simple means of keeping track of this tension throughout the full operation of binding up the armature. By its use the binding wire will not be stressed

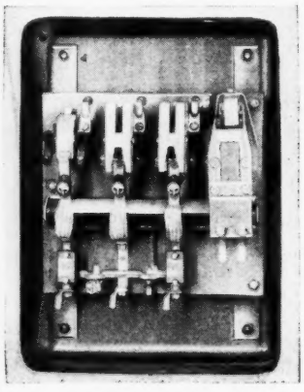


beyond the elastic limit and will be kept under uniform tension during the process of winding it in place.

The indicator can be applied to practically any type of armature-binding machine. The indicator dial is calibrated and graduated from zero to 500 lb., allowing the use of binding wire of any size within the range of the machine. One of the important features of the indicator is that the center pulley wheel is actuated by a heavy coil spring so that when the binding machine or lathe is started and stopped, a constant tension is maintained on the wire at all loads, which prevents the wires from becoming loose and releasing the tension in the band. *General Electric Company, May 8, page 824.*

Switch Connects Motors Across the Line

This switch consists of a triple-pole, restricted-blowout type, magnetically operated contactor with normally open interlock, and two hand-reset, temperature overload relays, all mounted on a molded base and inclosed in a drawn-shell, steel inclosing case. It is designed



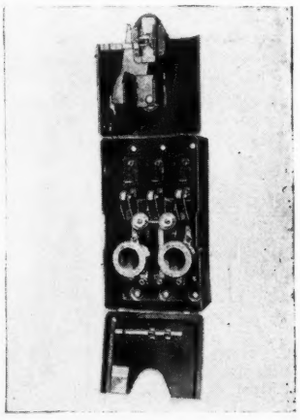
for use on standard voltages and frequencies. Overload protection is provided by two temperature overload relays. The operation of either or both relays will trip the contact mechanism so that all phases of the motor are properly protected.

The switch is ordinarily operated by means of a start-stop push-button station of the momentary-contact type and with an extra pole on the magnetic contactor to provide an electrical interlock for the holding circuit. The switch may also be operated by means of any type of single-pole master switch. *General Electric Company. May 1, 1928, page 783.*

Improved Manual Starter for A.-C. Motors

This manually operated across-the-line alternating-current motor starter embodies the latest improvements, including overload cutouts, roller-type contacts and small safety, dust-proof inclosing case.

The contacts are of the double-break type, cadmium plated, and are arranged to break the arc in two places, which tends to increase the life of the contacts. In addition, the contact

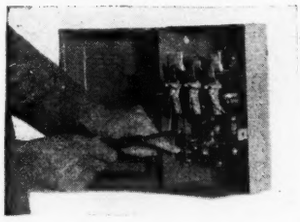


rollers turn after each operation to present a new contact surface for the next operation. Complete motor protection is obtained during both the starting and running periods.

The inclosing case is dust-proof, and the cover is in two parts. This permits opening the lower section only, for replacing fusible links in the thermal overload cutouts. The cover can be opened only when the starter is in the off position and all current-carrying parts are dead. Installation can be made without removing the panel from the case, and all parts are readily accessible for inspection. *Cutler-Hammer Manufacturing Company, Milwaukee, Wis. April 24, page 739.*

Full-Voltage Starter for Small Motors

With a maximum rating of 7½ hp. this starter completes a line of full-voltage starting devices ranging from 1 to 75 hp. It is particularly suited for the starting and protection of small induction motors driving machine tools, pumps, fans and similar equipment where remote control with complete protection is desired. It is equipped with hand reset on the thermal overload relay, but if automatic re-

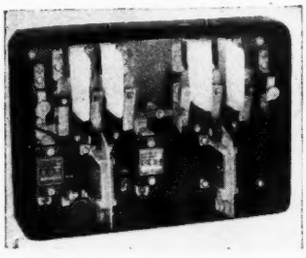


set is desired, the hand reset lever can readily be removed and automatic reset provided.

All operating parts are finished to prevent corrosion, the copper and brass parts being tinned and the iron and steel parts cadmium-plated. The approximate dimensions of the cabinet are 8½ in. wide by 12½ in. high by 5¾ in. deep, and the approximate weight 15 lb. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. April 17, page 699.*

Across-the-Line Motor Reversing Switch

This switch is adaptable for use on general-purpose motors where frequent reversing is required and on motor-operated doors, valves and machine tools. It consists of two triple-pole, barrier-type, magnetically operated contactors, mechanically and electrically interlocked, and two hand - reset temperature



overload relays mounted on a molded base and inclosed in a drawn-shell inclosing case.

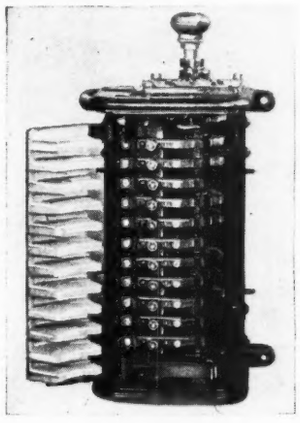
Two temperature overload relays with interchangeable heaters protect the motor from overloads. To adapt this switch for use with a motor of a different rating but the same voltage, it is merely necessary to select heaters corresponding to the motor current. *General Electric Company, Schenectady, N. Y. Aug. 14, page 287.*

Drum Switches for A.-C. Motors

Three special switches for use with squirrel-cage and slip-ring motors are included in this line. They have been designed particularly for the control of small cranes, hoists, machine tools, etc.

One of these switches is a primary-resistance drum type for squirrel-cage motors, providing four points forward and four points reverse. It is suitable for motors that do not have an overhauling load; that is, on hoists where worm gearing or automatic mechanical load brakes are used.

A second tyne is a primary-resistance switch for squirrel-cage motors, providing four points forward and one point reverse. This switch is suitable



for use where there is an overhauling load, such as on hoists, where a worm gear or automatic mechanical load brake is not used.

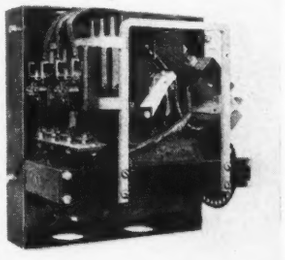
A third switch is a primary- and secondary-reversing type for slip-ring motors, providing five points forward and five points reverse. It is suitable for starting duty or speed-regulating duty and for use with 220-, 440- and 550-watt motors, rated at fifteen horsepower and less, where a five-point switch would be chosen. *General Electric Company, Schenectady, N. Y. March 6, page 442.*

Reactance Starter for Squirrel-Cage Motors

This starter is of the induction type, having a reactance coil that is connected in series with the motor leads, to give reduced voltage at starting. As the motor comes up to speed and the current decreases to a predetermined value, the reactance coil is short-circuited, which automatically connects the motor winding to line voltage.

The starter has two adjustable features. One in the starting current made by changing the position of the core in the reactance coil and the other in the current at which the throw-over from reduced to full voltage takes place.

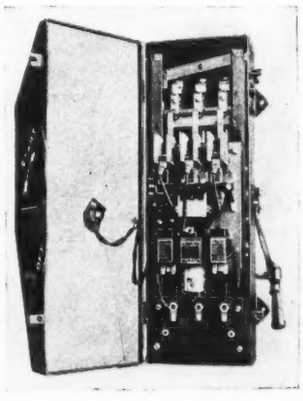
The motor is controlled by start and stop buttons. When the start button is pressed, it applies reduced voltage to the motor and the starting current is held within predetermined limits. As the motor comes up



to speed the current decreases, and when it has fallen off to the desired amount the switch is automatically thrown to the running position without interrupting the current to the motor. Overload protection is afforded by thermal relays and no-voltage release coils. *Lincoln Electric Company, Cleveland, Ohio. April 3, page 614.*

Resisto-Transformer Starters

With this resisto-transformer starter large squirrel - cage motors can be started without danger of causing line voltage jolts. No initial current influx occurs because the compression resistors are connected in series with the auto-transformer when

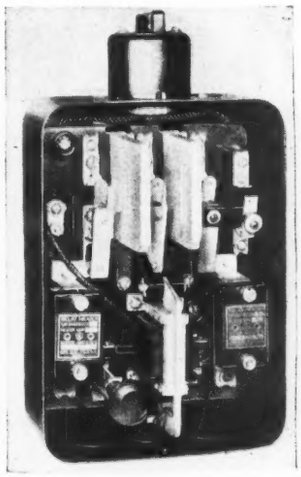


the motor is connected to the line. These resistors permit acceleration of the motor from standstill to full speed without opening the line connected to the motor. An auto-transformer reduces the line current in proportion to the transformer ratio. At full speed the motor is connected to the line without opening the line circuit, thus preventing the second current inrush. *Allen-Bradley Company, Milwaukee, Wis. Aug. 14, page 287.*

Hand-Control Switch Mounts on Starter

The most general application of this switch is in connection with machines controlled by thermostats, but it can also be used with float switches, pressure governors, etc., in the same manner as a thermostat.

One class is a maintaining-contact type whose action is

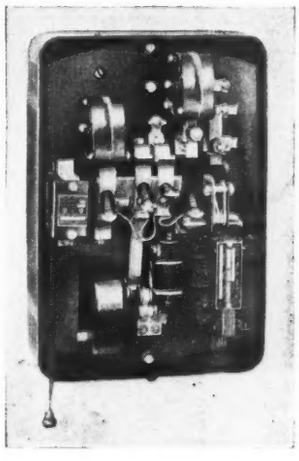


similar to a single-pole, double-throw switch. It is provided with three positions—"Hand," "Off" and "Automatic."

Another type is a two-position, momentary-contact switch provided with positions "Start" and "Stop." This is the equivalent of the usual push-button station of the same marking. Both switches have sufficient capacity to handle any magnetic starter up to 75 amperes capacity. *The General Electric Company, Schenectady, N. Y. July 24, page 161.*

Automatic Starters for Direct-Current Motors

These starters are designed to provide definite-time acceleration for constant- and adjustable - speed motors, and are divided into five types. One



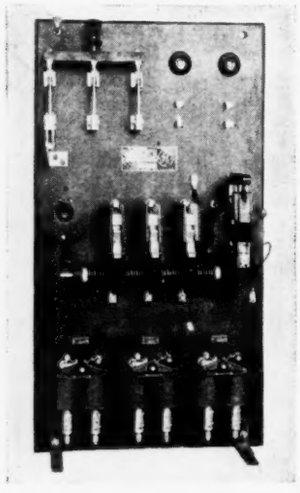
is for constant-speed general purpose applications. A second is the same as the first with the addition of dynamic braking. A third is for adjustable-speed motors with dynamic braking and full-field features. The fourth is a constant-speed reversing type with dynamic braking. A fifth type is for adjustable-speed, reversing, with dynamic braking and full-field features.

On those starters provided with dynamic braking a small relay is used to prevent the solenoid from being re-energized until the motor has come to rest. The contacts of this relay are connected in the pick-up circuit.

Thermal overload protection is provided by means of single-coil relays. These relays operate only in extreme conditions and serve as a warning to the operator that the motor or wiring requires attention. *General Electric Company, Schenectady, N. Y. May 15, page 871.*

Protective Panel for Crane Motors

This panel is designed to provide overload and under-voltage protection for all the motors of a crane and to be used with an

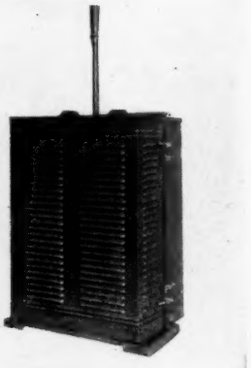


operator's emergency switch. It may be used with either drum switches or magnetic control panels. On this panel instantaneous overload relays have been substituted for the dashpot type.

The protective panel shown has a triple-pole line switch with a lockout device, a triple-pole line contactor, a reset push button, gravity-reset instantaneous overload relays, control fuses and two pilot-lamp receptacles, all mounted on a compound base. When drum controllers are used, undervoltage protection is provided by wiring the control circuit through the reset points on the drum switches. *General Electric Company, Schenectady, N. Y. June 19, page 1115.*

Dinky Controller with Nickel Alloy Resistors

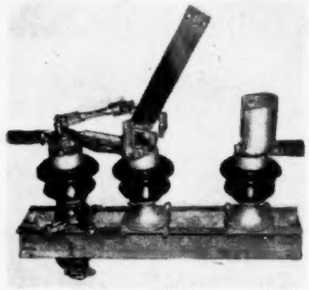
In this dinky-type controller ebony asbestos is used instead of slate for mounting the contacts and the resistors are nickel-alloy. The control is sup-



ported in a welded steel frame, and the main operating arm is mounted on ball bearings. The bearing-spider casting supports the dial as well as the arm and quadrant bearings, thus insuring correct alignment and even contact pressure. *Electric Controller and Manufacturing Company, Cleveland, Ohio. Aug. 21, page 331.*

Disconnecting Switch with Pressure Contact

A high-capacity disconnecting switch for group operation, in which the contact pressure is obtained independently of the blade movement. This switch, known as type RP-2 has ratings of 2,000, 3,000 and 4,000 amperes, at voltages of 7,500, 15,000 and 25,000. It is of the conventional vertical-break type, the blade being swung between



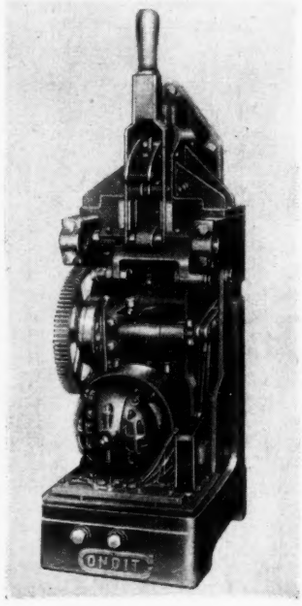
the open and closed positions by a linkage actuated by revolving insulator.

The switch is mounted on a channel-iron base and is supported by heavy-duty pin-type insulators. All pins are of non-corrodible material, and ball bearings are used to support the rotating members. The contacts are of copper-alloy castings. *General Electric Company, Schenectady, N. Y. Oct. 2, page 574.*

High-Speed Circuit-Breaker Operating Mechanism

The high-speed oil-circuit-breaker closing mechanism illustrated consists of a combination of springs, mechanism and a motor through which stored energy is released for closure at will or automatically. The actuating spring is always under tension ready for closure, as the motor sets the spring after each closing operation.

Less than one-fourth second elapses between the energizing of the release coil and the closing of the breaker. Automatic reclosing may be obtained by using an external timing relay. The mechanism is well adapted to panel, panel-frame or wall mounting in substations or isolated switchhouses. It can be furnished arranged with automatic trip-free with one, two or three coils; transformer trip or two-coil series trip and can be operated from a 200-watt potential transformer. The mecha-

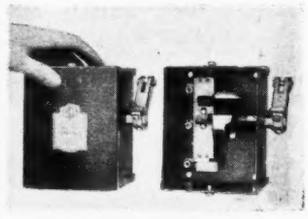


nism is specially adapted to the operation of moderate capacity breakers for synchronizing purposes and for automatic change-over switching. *The Condit Electrical Manufacturing Corporation, Boston, Mass. Feb. 7, page 265.*

Master Switch for Shipper-Rod Operation

This switch is for use as a pilot-circuit control device where starting and stopping of the machine is to be governed by a splined shaft, shipped rod or similar means.

Low-voltage protection is one of the features. Should the motor shut down for any reason, it will not restart until the switch has been operated again. The operating lever can be placed in any one of four positions, 90 deg. apart, to suit installation requirement. The switch is designed for three-wire control, but can also be

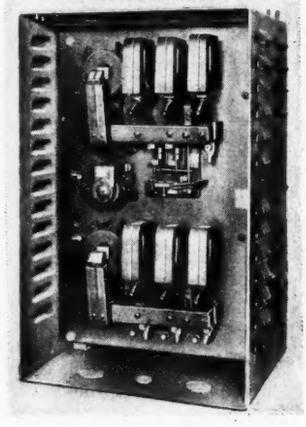


used for two-wire control on pilot circuits up to 550 volts. *Cutler-Hammer Manufacturing Company, Milwaukee, Wis. July 3, page 33.*

Thermal Relays Give Overload Protection

A thermal overload relay can be had that retains calibration and automatically permits the safe overload capacity of the motor to be fully utilized. This device follows the heating curve of the motor, which means the motor will not shut down instantly in case of high but harmless overcurrent demands.

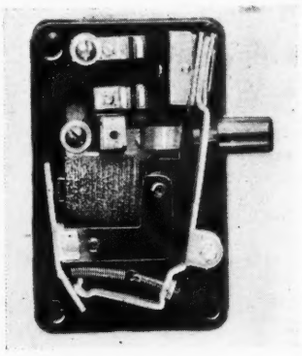
The relay is easily adjusted for plus or minus 20 per



cent of normal rating, by moving a small lever. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. July 31, page 207.*

Protectoswitch for Small Motors

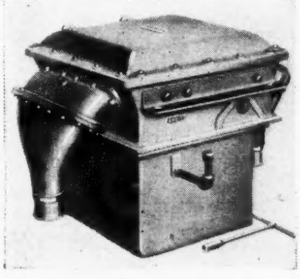
A small circuit breaker known as No. 1,600 Protectoswitch for use on motors of $\frac{1}{4}$-hp. capacity or smaller. The dimensions are $3\frac{9}{16}$x$2\frac{1}{4}$x$1\frac{1}{2}$ in. For 110 and 250 volts alternating current the maximum current rating is 9 amperes, and for 240



volts direct current, 4 amperes. Fine adjustment for opening the circuit at any current between 3 and 16 amperes can be made by turning a screw stud inside the housing. *Precise Manufacturing Company, Rochester, N. Y. Oct. 23, page 689.*

Manhole Oil Circuit Breaker

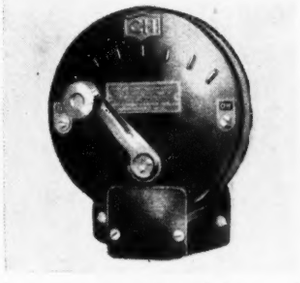
A manhole oil circuit breaker, known as the type M-9, is designed for underground distribution for all voltages up to 7,500. The frame is arranged on two sides for either single-



or multi-conductor cable sleeves, is furnished for automatic or non-automatic operation and in three-pole, for 400, 600 and 800 ampere capacity at 7,500 volts with an estimated interrupting capacity of 3,000 amperes at 7,500 volts. *Condit Electrical Manufacturing Corporation, Boston, Mass. Sept. 25, page 534.*

A Regulating Rheostat for General Service

This rheostat can be used to control the speed of fractional-

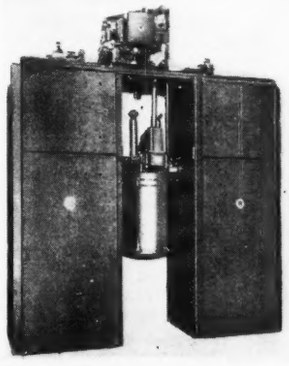


horsepower motors driving small blowers, fans and similar apparatus. It can also be used as a dimmer on lighting circuits, or as an electric-heater regulator.

The mechanism consists of a cement-embedded resistor with brass contact buttons protruding through the cement, and a contact arm to move over the buttons and vary the resistance. *Cutler-Hammer Manufacturing Company, Milwaukee, Wis. Sept. 18, page 496.*

Steel Structures for Circuit Breakers

A circuit breaker mounted in a fabricated steel structure designed to replace the concrete cell features this equipment.



With this construction the time and expense of installation are materially reduced, because building of forms, pouring concrete and cleaning up after installation of the apparatus are eliminated. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. July 10, page 74.*

Equipment for Changing Transformer Taps Under Load

The transformer tap-changing equipment shown is arranged for mounting directly on the transformer tank. The housing is divided into two oil-filled compartments. The upper compartment opens directly into the transformer, facilitating connec-

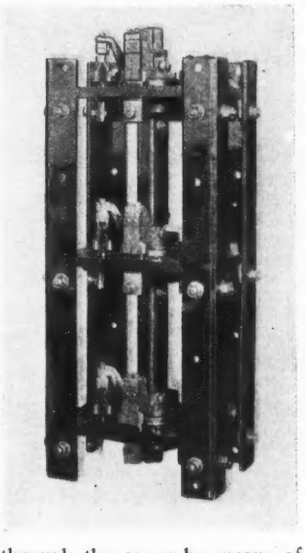
tion of transformer leads and completely immersing them in oil. The lower parts of the bushings extend into the lower compartment and carry the stationary contact feet. The moving contact is operated from a toggle and cam operating mechanism.

Equipment designed for either hand or remote control operation is available. Only one switch operation is needed per tap change, and every position is an operating position. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Aug. 21, page 330.*

No Load Transformer Tap Changer

The type TF tap changer illustrated is used for changing tap connections from the outside of the transformer case and is intended for operation only when the transformer is dead. It is adaptable to both single-phase and three-phase transformers.

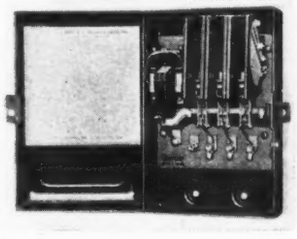
The unit is mounted on the transformer under oil, and the operating shaft is brought



through the cover by means of a specially constructed oiltight and airtight stuffing gland. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Oct. 16, page 648.*

Magnetic Contactor for Light and Power Circuits

This line of alternating-current magnetic contactors is de-

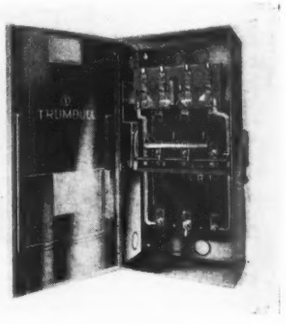


signed especially for controlling lighting and power circuits automatically. High efficiency hammer-type magnets with self-aligning armature, continuous-duty magnet coil, hardened-steel bushings, tin-dipped solid-copper contacts, magnetic blowouts and chimney type arc shields are some of the outstanding features.

A wide variety of types and sizes are available. There are two-, three- and four-pole types with a capacity range from 20 to 150 amperes. *Cutler-Hammer Manufacturing Company, Milwaukee, Wis. Sept. 25, page 533.*

Polyphase Service Switch

A line of polyphase meter-service and entrance switches are available in sizes with test connection, for 30 to 400 amperes and without test connec-



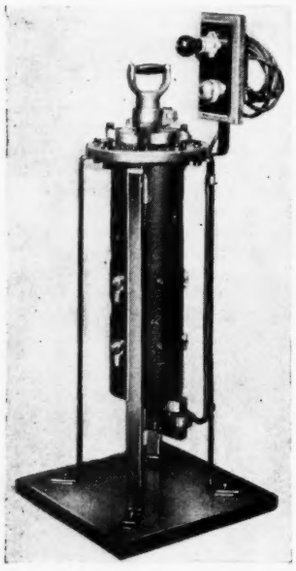
tions for 30 to 600 amperes. They are of slate-base construction, with the contacts mounted on top where they can be easily inspected. The fuses are made accessible, but an interlocking device prevents the fuse compartment being opened unless the switch is in the open position.

The switches can be furnished with or without testing facilities in boxes having sealable covers or with a slide that gives access to the fuses when the switch is in the off position. *Trumbull Electric Manufacturing Company, Plainville, Conn. July 24, page 161.*

Short-Circuiting and Grounding Switch

This switch has three positions: Connecting the primary cables to the high-voltage windings of the transformer; disconnecting the transformer from the line; short-circuiting and grounding the primary windings of the transformer. On the switch there is an electrical interlock to prevent its operation while the transformer is alive from either the secondary or primary sides.

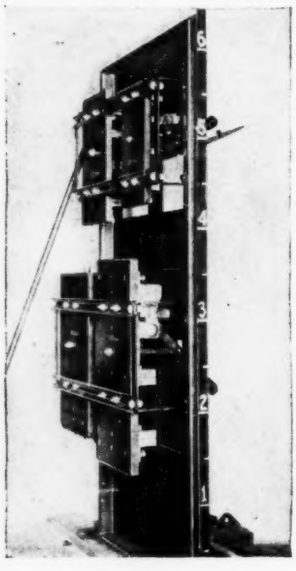
The switch is contained in a heavy cellulak tube. Inside this tube are bolted stationary gunmetal contacts for the various connections. An insulated rod carries brush contacts that can



be rotated to make the different connections. The switch is contained in an oil tank to insulate all parts from the effects of moisture and dirt and high voltage. *Packard Electric Company, Warren, Ohio. March 27, page 570.*

New Type Back-of-Board Switches

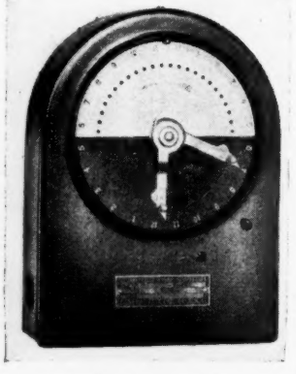
These back-of-board knife switches are particularly adapted for industrial control and central-station auxiliary equipment applications. Each switch with its operating mechanism is mounted on a slate base behind the steel panel, with only the operating handle passing through the panel. Complete accessibility of the switch and fuses from the front of the switchboard is provided by means of a fuse door. This is interlocked with the switch handle so that the switch must be in the full open position before the fuse door can be opened, and the switch cannot be closed while the door is open.



These switches are available in a large number of combinations. They are made for 250 volts direct current and 500 volts alternating current and for capacities ranging from 30 to 800 amperes. They can be obtained in one-, two-, three-, or four-pole units, fused or unfused, and with or without attachments for quickly opening the circuit. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. June 12, page 1071.*

Automatic Time Switch

A new small motor-operated automatic time switch for use in controlling alternating-current circuits, where the load is less than ten amperes has been made available. The switch has a revolving dial divided into 24 parts, half of the dial being finished in white enamel and the other half in black, to represent day and night hours. Two arms, registering on the dial, can be set at half-hour intervals



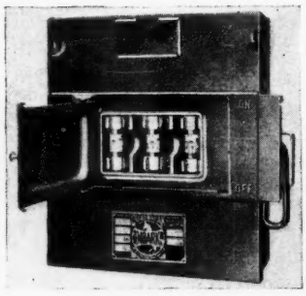
to control the making and breaking of the load circuit, the maximum time interval being 11½ hours.

The time-keeping element is a small disk-type synchronous motor. A single-pole contactor is used. The contacts are of silver and are mounted in brushes that bear directly on the control cams. The switch may be operated by hand, after which the time must be checked. *General Electric Company, Schenectady, N. Y. April 24, page 741.*

Service Switch Made with Quadruple Break

A polyphase service-entrance switch, known as Noark Quadbreak, is so constructed that the circuit is interrupted at four places. Increasing the number of breaks increases the rupturing capacity of the switch without breaking in oil, using blowout coils or other devices for quenching the arc.

These switches are inclosed

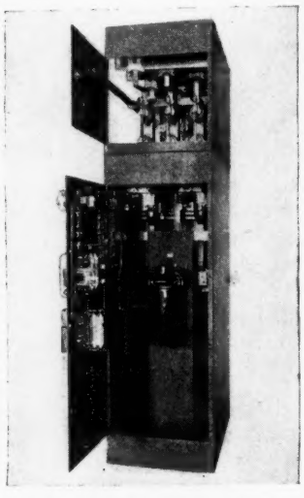


in a cabinet. On one style there is a single cover by means of which the fuses are sealed and are accessible only by breaking the seal and opening the cover. The other style has an auxiliary door in the main cover, through which the fuses are accessible when the switch is in the off position. *Colts Patent Fire Arms Manufacturing Company, Hartford, Conn. Jan. 22, 1929, page 142.*

Automatic Reclosing Feeder Equipment

A line of automatic reclosing feeder equipment has been arranged in completely inclosed cubicles, containing a circuit breaker and disconnecting switches operated automatically by relays mounted on the front panel.

Circuit breakers and disconnecting switches are mounted on a channel frame which also supports the walls of the cubicle. The front panel is arranged in



the form of a door, and on it are mounted the necessary relays and meters for providing the automatic reclosing feature.

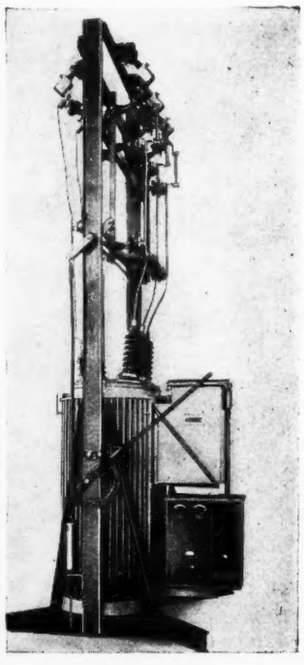
On the back of this panel is located all the control wiring. A rear door affords a means for conveniently inspecting the breakers and their parts.

The cubicles are made in standard sizes and in ratings up to 7,500 volts. They may be arranged side by side to form a continuous switchboard. *General Electric Company, Schenectady, N. Y. July 10, page 74.*

Unit Transformer Substation

A design of substation which in one unit combines a power transformer, switching facilities, overload and short-circuit protection and means of metering has been developed. The construction utilizes a standard three-phase star-connected primary-power transformer of the usual design except that it is arranged for inserting an oil circuit breaker in the connections between the primary winding and the common or star-connection point. Current transformers suitable for metering and potential transformers are placed within the power transformer compartments.

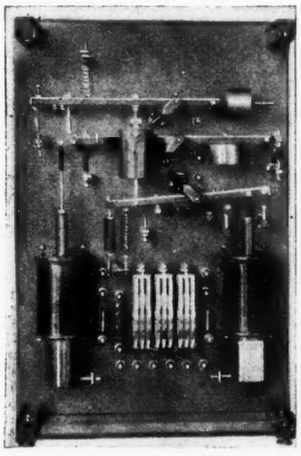
Protection for the primary leads and windings is afforded



by a fuse rated for short circuit only. Overload protection is secured from secondary current transformers energizing trip coils of the oil circuit breaker, causing it to open and de-energize both primary and secondary windings. *Condit Electrical Manufacturing Corporation, Boston, Mass. July 10, page 75.*

Automatic Synchronizer

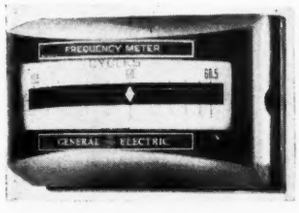
A new automatic synchronizer works on an entirely new principle. It can be adjusted to operate between definite frequency difference limits only and to close its contacts at a certain phase advance which will be proportional to the momentary frequency difference. The amount of advance, or the time elapsing between energizing the breaker's closing relay and closing the breakers, can



be varied by a single adjustment to suit varying conditions. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Oct. 23, page 690.*

Frequency Meter Has High Degree of Accuracy

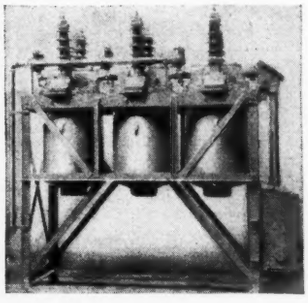
A line of resonant-circuit type frequency instruments in which full-scale range may be as small as a single cycle is available. It includes five-scale calibrations, the most sensitive having a full-scale range be-



tween 59.5 and 60.5 cycles. Other calibrations are for 2, 5 and 10 cycles, arranged for service on 25-, 50- and 60-cycle systems. All are intended for 110-volt operation. Accuracy is a feature of these meters. They have no appreciable voltage, wave-form or temperature errors. *General Electric Company, Schenectady, N. Y. Sept. 25, page 535.*

Heavy-Duty Oil Circuit Breaker for 25,000 Volts

Built for heavy duty service and applicable to both indoor and outdoor service this breaker is suitable for 600, 1,200 and 2,000 amperes at 15,000 and 25,000 volts. The operating mechanism may be either the direct-current solenoid or motor-operated types. The housing is divided into two compartments and mechanical connection of the pull rods is made through the divided housing by a shaft-operated bell crank which avoids the possibility of transfer of oil and gas from one pole unit to another or from pole unit to mechanical housing. Each pole unit is equipped with a hydraulic bumper to prevent



rebound. A muffler eliminates oil throw and scavenges the gases. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Dec. 4, page 936.*

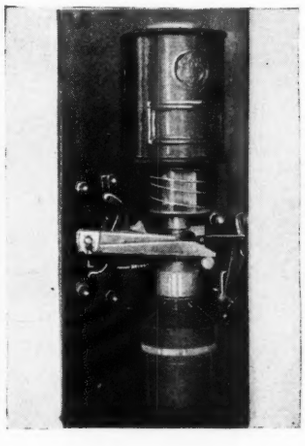
Plug Fuses with Colored Tops

Plug fuses with colored tops, a color for each size, are available. The use of the color enables the user to know readily the capacity of the fuse. The different colors used are: All fuses 0 to 6 amperes have a brown top; 10 amperes, yellow; 15 amperes, blue; 20 amperes, pink; 25 amperes, red, and 30 amperes, green. *Trico Fuse Manufacturing Company, Milwaukee, Wis. Nov. 6, page 774.*

Time Relay Not Affected by Temperature

Absence of dashpots makes this type HG relay well suited to widely varying room temperatures, as temperature changes do not affect its accuracy. It operates on the hour-glass principle with mercury escaping through an orifice in the bottom of a cup.

The coil may be arranged for 110- to 550-volt, 25- to 70-cycle alternating current or 115- to 550-volt direct current. Relays



for alternating-current circuits have continuous-duty operating coils. Relays for direct-current use have intermittent duty coils. Alternating-current relays are provided with laminated plunger equipped with a shading coil to give noiseless operation. *Electric Controller & Manufacturing Company, Cleveland, Ohio. Oct. 2, page 573.*

Power-Failure Signal Relay

This signal relay is designed for application where a small, inexpensive device is needed to actuate a warning signal when the power fails or the voltage drops on an important circuit. The relay can be used on either

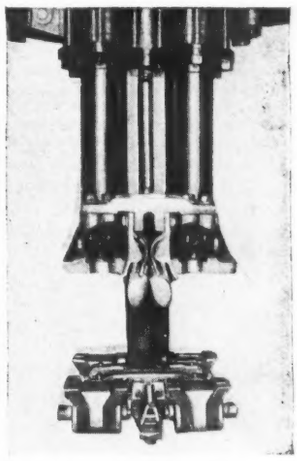
direct or alternating current. The device is mounted on a molded compound base, 1¾ in. wide and 2½ in. high. It can also be supplied for panel mounting.

A fine adjustment of pick up and drop out may be obtained. On test, the relay dropped out at 106 volts after picking up on 112 volts, or at 95 per cent pick-up voltage.

A typical application of the relay is on storage-battery charging outfits. When the battery falls below the critical voltage, the relay places it on charge or increases the charging rate and disconnects it when the voltage has come back to its full value. *General Electric Company, Schenectady, N. Y. Aug. 21, page 331.*

High-Capacity Heavy-Duty Oil Circuit Breaker

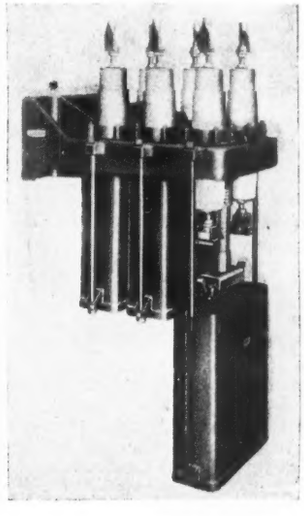
This circuit breaker is built in 4,000, 5,000 and 6,000 ampere capacities, at 15,000 volts, with a rupturing capacity of 2,500,000 kva. at 15,000 volts. The breaker units are supported from the top plate, which also carries the operating mechanism. Condenser-type terminals are used to pass the conductors



through the main base. The electric mechanism consists of a double solenoid designed so that the pull of the closing mechanism closely matches the effort required to close the breaker units at all points of the closing stroke. This gives adequate speed of closing for synchronizing, and at the same time keeps down stresses within the structure. A control relay panel is also included in the closing mechanism. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. April 3, page 614.*

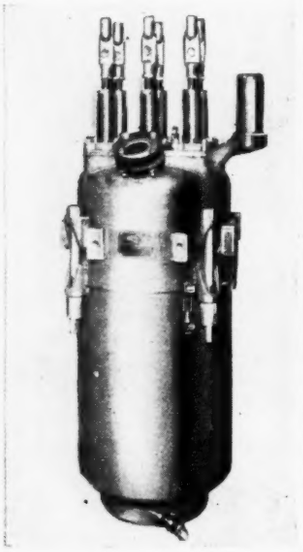
Oil Circuit Breaker for Industrial Service

This oil circuit breaker is suitable for the control and protection of feeders in substations and industrial service. A tank per pole construction is used. The contacts are of the inverted laminated break type, designed to withstand high inrush currents, and heavy arcing contacts tend to reduce the arcing on interruption. The breaker is available in 400-, 600-, 800- and 1,200-ampere capacities at 15,000 volts; 1,600 amperes at 7,500 volts. *Condit Electrical Manufacturing Corporation, Boston, Mass. Dec. 4, page 938.*



Heavy-Duty Oil Circuit Breaker for 15,000 Volts

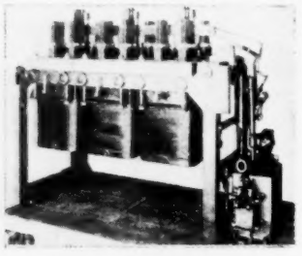
Combing the contact units of all three phases within a single cylindrical steel tank is the feature of this oil circuit breaker. The breaker is designed for heavy duty at 7,500 and 15,000 volts, and current ratings from 400 to 3,000 amperes. The three



phases are separated by heavy insulating barriers interposed between the three groups of contacts, and the tank itself is lined with the same material to avoid the possibility of arcing between live parts and ground. Operation may be by hand or by solenoid or motor mechanisms. *General Electric Company, Schenectady, N. Y. July 17, page 120.*

Oil Circuit Breaker for 2,500 Volts

This oil circuit breaker is adapted for service where a relatively compact unit for heavy alternating current at 2,500 volts or less is required. It is self-contained, the pole units, operating mechanism and control panel are carried on a steel



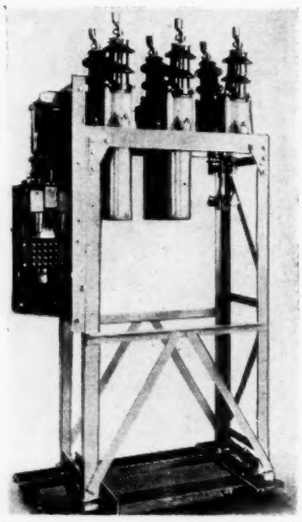
structure arranged to mount on and bolt to the floor. The standard arrangement for operating the breaker is by an electric solenoid mechanism.

A tank is provided for each pole unit. The current-carrying stationary parts consist of two groups of three copper bars, on the lower end of which is a grooved copper block forming the stationary contact foot. The moving contacts are the semi-elliptical brush type, which make high-pressure wiping contact. Easily renewable arcing contacts protect the main contacts. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. June 26, page 1157.*

Outdoor Oil Circuit Breaker

The type FO-24 oil circuit breaker illustrated is for outdoor service, is available in single-throw two- and three-pole construction, and in capacities of 400, 600 and 800 amperes at voltages of 15,000 or less. Motor, solenoid and manually operated mechanisms are applicable to all capacities. The manual-operating machinism is self-contained.

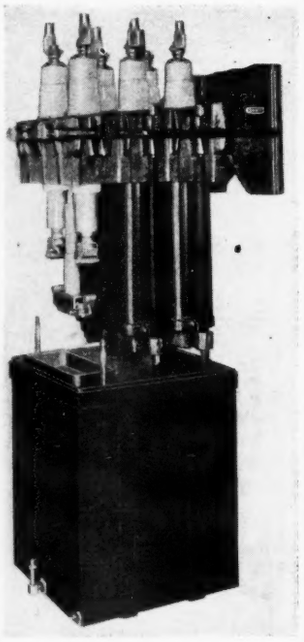
Electric-operating mechanisms are mounted directly on the frame. Motor mechanism may be used for either alternating, or direct-current control



and the solenoid for direct current only. The breaker is equipped with self-cleaning, high-pressure laminated brush contacts. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Oct. 2, page 573.*

Oil Circuit Breaker Has Double-Tank Construction

An oil circuit breaker of relatively high interrupting capacity and comparatively small over-all dimensions has a frame of heavy construction to afford rigidity. A double tank con-

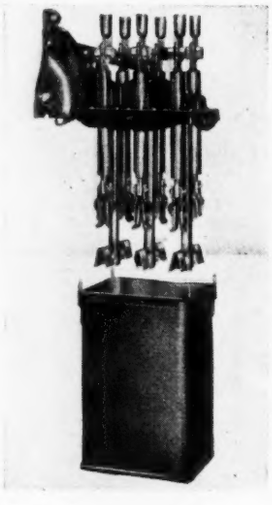


struction is used. The main current-carrying contacts are inverted laminated brushes of special design which will withstand high inrush currents. Heavy arcing contacts are used, whose large thermal absorption capacity materially reduces arcing on interruption.

The breakers are built for 400, 600, 800 and 1,200 amperes at 15,000 volts and 1,600 amperes at 7,500 volts, with an estimated interrupting capacity of 7,000 amperes at 15,000 volts. They are furnished two, three and four poles, single-throw, manually or electrically operated. *Condit Electrical Manufacturing Corporation, Boston, Mass. July 3, page 32.*

Oil Circuit Breaker for Small Installations

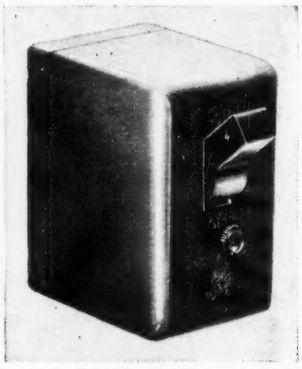
The type FK-33 oil circuit breaker is rated 4,500 volts, 200 and 400 amperes and made in



two, three and four poles, single- and double-throw types with interrupting capacities of approximately 20,000 kilovolt-amperes. This breaker is recommended for use in small plant and industrial installations. It is compact in design and has small over-all dimensions. *General Electric Company, Schenectady, N. Y. Dec. 18, page 1014.*

Small Automatic Circuit Breaker

An automatic circuit breaker is designed for use on 125-volt alternating or direct current, with ratings of 6, 10 and 15 amperes. It differs from similar breakers in that it combines the positive action of the

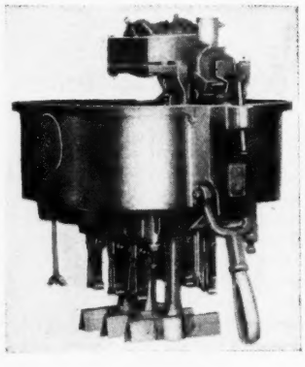


electromagnet with the time lag of the thermo-metallic element.

As an appliance switch it can be mounted in any position, has no exposed metal, functions equally well on alternating or direct current, and will withstand severe vibration without opening. *General Electric Company, Bridgeport, Conn. Sept. 18, page 496.*

Industrial-Type Oil Circuit Breaker

This type F-10 oil circuit breaker is applicable to 750- and 2,500-volt circuits and has a current-carrying capacity of 200 and 300 amperes. It is furnished



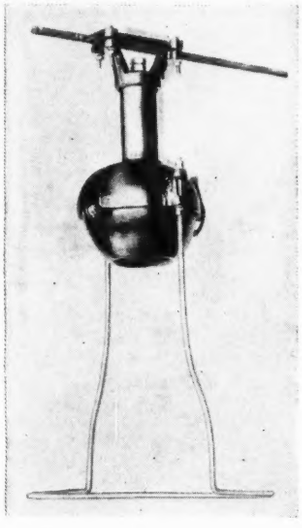
in two-, three- and four-pole combinations and is either automatic or non-automatic as desired. The automatic breaker

has an interrupting capacity of 5,000 amperes on the 200-ampere size and 7,500 amperes on the 300-ampere design at rated voltage.

Each contact is divided into the arcing portion and the main current-carrying part. These are so located that there can be no arcing on the main current-carrying part of the contact. *The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Sept. 25, page 535.*

Static-Glow Outdoor Potential Detector

This outdoor potential detector consists of a vacuum-type static-glow lamp mounted in standard fuse clips and inclosed in a metal case having a glass window. It is suspended from the line conductor by a clamp in such a manner that the lamp is visible from the ground. One

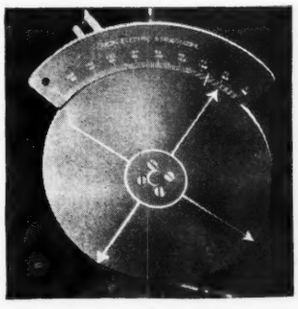


terminal of the glow lamp is connected to the line conductor through the clamp, and the other is fastened to a brass rod antenna suspended from the case. The detector is applicable to line voltages from 4,500 to 220,000. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Aug. 7, page 247.*

New Stroboscope Uses Neon Lamp

An electrically operated stroboscope has been developed for determining the angle of lag of synchronous machine rotors under load. It operates by a small Neon-gas lamp, which gives flashes of light lasting less than one fifty-thousandth of a second each, and thus illuminates a white line on a stroboscopic disk fixed to the rotor shaft of the machine under test, for so short a time that the line appears to be standing still. Fixed concentrically with the disk and just outside its circumference is a stationary scale marked in electrical degrees, and upon this the white line acts as a pointer, giving a direct reading of rotor displacement.

In operation the transformer of the instrument is connected

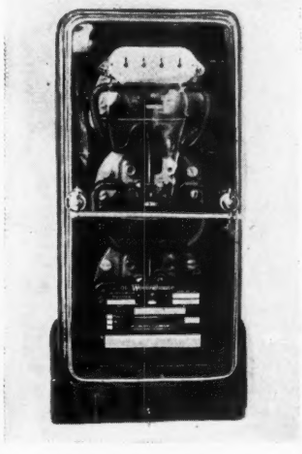


to the same voltage source as the synchronous machine. The high- and low-tension windings are linked by a core of special transformer iron, which rapidly becomes saturated as the flux wave of each half-cycle rises from zero. As a result, an extremely sharp voltage peak is induced in the secondary winding, causing the tube to flash twice during each complete cycle. *General Electric Company, Schenectady, N. Y. June 26, page 1159.*

Three-Element Watt-Hour Meter

This meter is designed primarily for use on three-phase four-wire circuits where a high degree of accuracy in measurement is desired. It is designed to meter the energy correctly regardless of current unbalance, voltage unbalance or power factor.

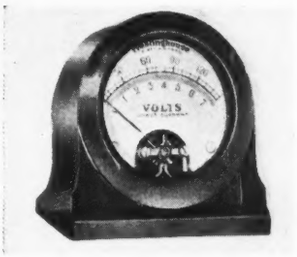
In construction the meter consists essentially of three single-phase elements placed one above another, having all three disks



mounted on a common shaft. The entire meter element is a unit assembly and can be removed from the case without affecting the calibration. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. July 17, page 121.*

Portable Direct-Current Instruments

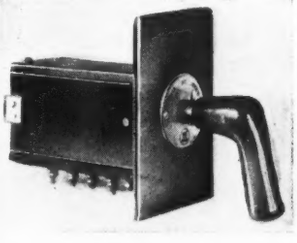
These instruments, known as type PX2, are particularly suitable for miscellaneous testing. They are of the permanent magnet moving-coil type. The moving coil rests on hardened steel pivots moving in sapphire jewel bearings. The mechanism is mounted on a molded micarta base and has a case of the same material. The line includes millivoltmeters, double-range voltmeters, milliammeters, am-



meters, radio-frequency ammeters, and galvanometers. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. June 19, page 1115.*

New Instrument and Control Switches

Rotary switches have been provided for connecting any instrument or group of instruments selectively to various circuits as may be required for metering, synchronizing or for other switching functions. They are especially adapted for mounting in small space and



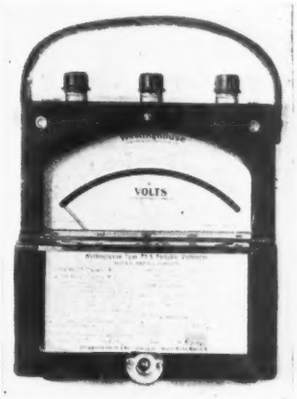
present a uniform appearance which will harmonize with instruments and similar apparatus on switchboards.

The turning of the switch handle operates a shaft on which are mounted various contact-making segments. These segments make or break contact with stationary fingers supported on an insulated base.

These switches can be mounted on any commercial thickness of panel and are made in six standard lengths. All switches are insulated for 600-volt service alternating and direct current. The contacts will carry ten amperes continuously and will open five amperes under normal conditions. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. April 3, page 614.*

Portable Alternating-Current Instruments

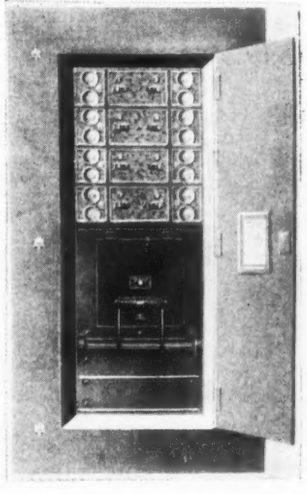
The instruments contained in this line are of the direct-reading type and are applicable for general testing where high accuracy is required. The voltmeters and single-phase watt-



meters are of the electrodynamometer type. The ammeters are of the moving iron type using vanes of non-residual metal. They can be used without appreciable error on either direct current or alternating current. *The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. July 3, page 31.*

Panelboards Have Molded Bakelite Parts

Bakelite is used for all molded parts in this new line of panelboards. These include adapting units, sectional base, switch covers, switch handles, supporting blocks and blank sections.

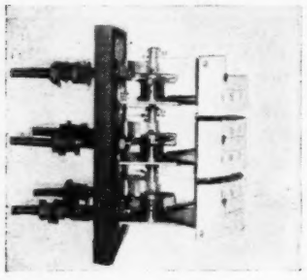


The main switches of 60-, 100- and 200-ampere capacity are of an improved brush type, with exceptionally quick break. Tumbler switches are 30-ampere 250-volt rating, of heavy-duty type. Brush switches are of 250-volt rating heavy type.

Plus fuses and cartridge fuses are interchangeable. No steel covers used around branch fuses or tumbler switches and when main switches or fuses only are used in sub-feeds they are under separate locked covers. *Square D Company, Detroit, Mich. Jan. 1, 1929, page 30.*

Polyphase Ammeter for Three-Phase Circuits

A polyphase ammeter consisting of three horizontal edgewise mechanisms, mounted one above another in a single case with a single window exposing

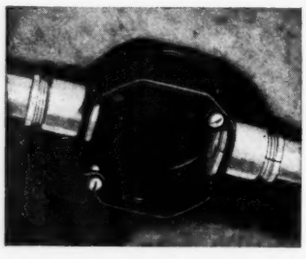


all three scales, has been developed. This arrangement permits ready comparison of the currents in the different phases of a three-phase circuit.

The elements are of the standard electromagnetic type. Damping is obtained by a vane moving in an inclosed chamber. The three elements are magnetically shielded from one another so that there is no mutual interference. *Roller-Smith Company, New York City. Dec. 18, page 1013.*

Threadless Thin-Wall Electric Conduit

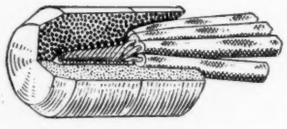
This electrical metallic tubing known as "Steel tubes" is a thin-walled rigid conduit having the characteristics of so-called heavy, standard conduit but



lighter in weight. It is made from cold-rolled open-hearth steel, which provides a tube ductile enough to be bent readily to any desired shape.

The wall of this conduit is approximately one-third the thickness of standard conduit. It is used without threading, connections being made by means of a union compression-type coupling. Part of this coupling may be used as an adapter to connect the conduit to standard threaded or threadless fitting.

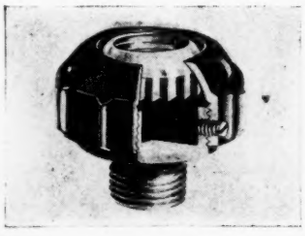
It is supplied in ten-foot lengths and is available in one-half, three-fourths and one-inch electrical trade sizes, with the same inside diameter as heavy-wall conduit. The exterior is electrogalvanized, and the inside is coated with baked enamel. *Electrical Division of Steel and Tubes, Inc., Cleveland, Ohio, a subsidiary of the Republic Iron & Steel Company. Jan. 1, 1929, page 30.*



Solderless and Tapeless Wire Connector

The body of this connector is made of molded insulating material inclosing a receptacle for the ends of the wires. In the receptacle is a copper-coated tapered steel spring with a current-carrying capacity equal to the wires to be joined. When making up the joint, the connector is placed over the ends of the wires and twisted into place. The copper-covered spring threads in with the wires and gives a positive contact.

These connectors are made in two sizes. One is for joining groups of wires ranging in size from two No. 18 to four No. 14. The other size will join groups ranging from four No. 14 to three No. 10. The wires may be either solid or stranded. *Ideal Commutator Dresser Company, Sycamore, Ill. Sept. 18, page 494.*

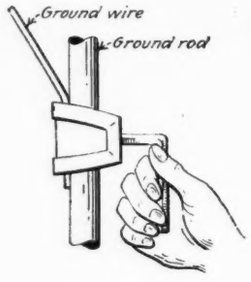


Suspension Joint Fitting for Conduit Wiring

This self-aligning suspension fitting adaptable for use with all standard conduit fittings consists of a universal joint inclosed in a cast-iron outer shell. The universal joint is so made that it cannot turn, thus protecting the wires that pass through it from abrasion or twisting. It will permit the fixture to swing freely in any direction to the extent of twenty degrees or more. This fitting assures the proper plumbness of the fixture stem regardless of whether the surface wired over is level or not. *The Adapti Company, Cleveland, Ohio. Aug. 7, page 248.*

Ground-Wire Clamp

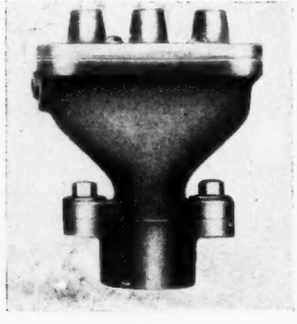
A ground-wire clamp that encircles the ground rod is designed to bind the wire directly to the driven member. No solder or heat is required; it is only necessary to pass the grounding wire into the clamp which has been placed around



the driven rod, then tighten by means of a setscrew. *Copperweld Steel Company, Glassport, Pa. Sept. 25, page 534.*

Cable Terminal for Low-Voltage Circuits

A low-voltage terminal has been provided for indoors, designed for mounting on the end of pipe conduit or connected to the sheath of a lead-covered cable by means of a stuffing-box

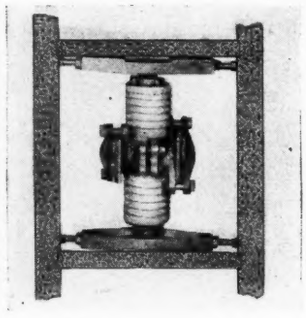


gland or a plumber's wiped joint. They are made of cast iron with bakelite insulating tops and conductor outlets, the joints being made with gaskets to exclude moisture.

They are suitable for terminating low-voltage power or control cables or similar low-potential conductors. The terminal shown in the figure is designed for three conductors, but they are to be had for almost any desired number of wires. *The Standard Underground Cable Company, Pittsburgh, Pa. Feb. 28, Page 397.*

Bus-Connection Support Easily Installed

No setting of bolts in concrete or drilling for expansion bolts is required for this support. It is mechanically expanded against the sides, top and bottom of the compartment or enclosure in which it is



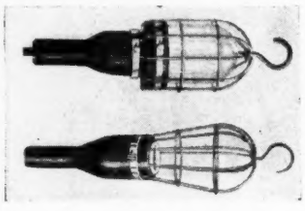
installed. The support consists of an ordinary cylindrical bushing with expansion elements at either end and a connection clamp over the middle.

The vertical expansion element is a pipe nipple with a stationary flange and a movable locknut. The stationary flange is provided with a screw and locknut at either end, by means of which it is expanded horizontally against the sides of the inclosure. *General Electric Company, Schenectady, N. Y. May 1, 1928, page 783.*

Shock- and Vapor-Proof Extension Lamps

These extension lamps have insulated handles that extend well over the socket and lamp terminals. The handle is made of a high-grade rubber compound and is designed to cover the lamp socket and terminal, with proper spacing allowed for joints. A seat is provided inside the handle to act as a cord grip, thus removing all strain from the socket and terminals.

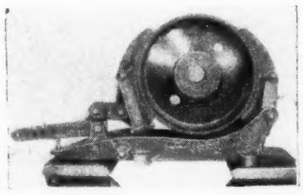
This lamp is designed to prevent combustion and explosion



where gas and dust hazards exist. The handle and socket holder are in one unit, molded of a rubber compound and, threaded to hold the lamp. The dust- and vapor-proof globe is of heat-resistive glass, held in place by a guard of heavy wire cadmium plated to prevent rusting. *Daniel Woodhead Company, Chicago, Ill. March 6, page 442.*

Mechanically Operated Brake

The mechanically operated shoe-type brake illustrated is designed for bridge drives of electric traveling cranes, electric hoists and other applications requiring foot-operated or hand-lever operated brakes. It



is equipped with thick molded asbestos shoes, and all parts are interchangeable with the electrically operated brake made by this company. *Electric Controller & Manufacturing Company, Cleveland, Ohio. Dec. 4, page 937.*

Gas-Proof Heavy-Duty Portable Light

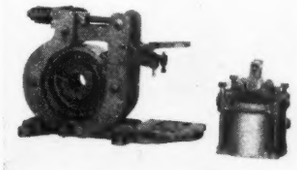
A portable light, which is water-tight, vapor- and gas-proof, has a base of heavy brass and is provided with a substantial hardwood handle. The lamp is protected by a glass globe that screws into the base and is in turn protected by a heavy brass-wire guard. The light is

furnished with 25 ft. of rubber-covered cord and an all-rubber plug. *Motor City Electric Company, Detroit Mich. Sept. 11, page 455.*

Solenoid Brakes with Spring-Setting Device

These brakes are especially designed for severe service in connection with mill, crane and hoist motors. The braking mechanism is held in the off position by a coil and plunger. When power is applied to the motor, the coil is energized and the brake is released, and when the power is shut off, the spring-setting device forces the mechanism into the closed or braking position.

Both alternating- and direct-current brakes use the same brake mechanism and frame, the solenoids being interchangeable. Small-diameter brake wheels are used, minimizing flywheel effect. The brake shoes are of cast iron and self-aligning, and com-

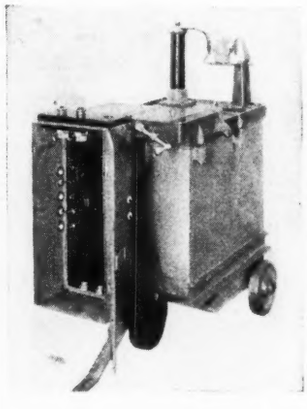


pressed woven-asbestos lining furnishes the braking surface for the shoes. *General Electric Company, Schenectady, N. Y. June 5, page 1031.*

High-Voltage Portable Testing Set

A portable truck-type high-voltage set is now available for testing insulation and also transformer and circuit-breaker oil. The set comprises a testing transformer, auto-transformer, induction regulator, oil-testing cup and control equipment, mounted in a rectangular tank fitted with wheels for transportation.

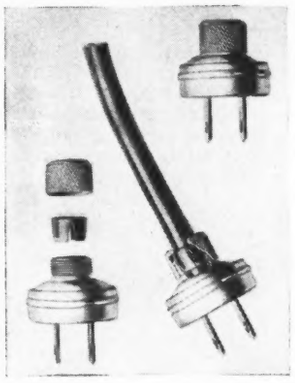
The induction regulator gives a variable test voltage from zero to 50,000 volts in a continuous smooth curve. Red and green indicating lamps are provided. The control circuit consists of an overload relay with with an electrical reset, a double-pole contactor with blow-out coils, and a make-and-break



interlock for the signal lamps, all controlled from a pushbutton. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Aug. 14, page 288.*

Unbreakable Attachment Plug Gap

An unbreakable attachment plug cap with an improved type of cord grip which acts as a positive strain relief is intended

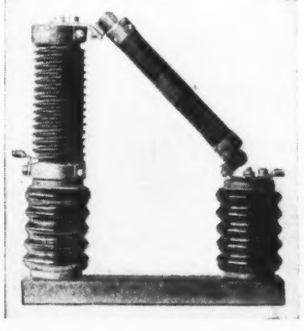


to lessen short-circuit hazards. The cord grip is accomplished by means of a knurled collar which wedges a fiber bushing tightly against the cord. The cap has a rustproof armored shell of heavy brass and bakelite is used to hold the blades in place. *Cutler - Hammer Manufacturing Company, Milwaukee, Wis. Sept. 11, page 455.*

Fuse and Wire-Wound Resistor for Transformer Protection

A combination potential transformer fuse and wire-wound resistor for 2,500- to 25,000-volt service. It is intended for indoor application and can be mounted on any flat surface or on 1¼-in. pipe.

The resistors are made up of coiled nichrome wire wound in



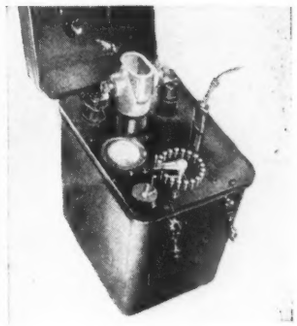
the grooves of a heavy wet-process porcelain tube. The resistor may be mounted either in line with or perpendicular to the insulators. *The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. July 24, page 161.*

Small Portable Oil-Testing Set

This small portable set for testing the dielectric strength of transformer and circuit-breaker oil is light and compact and may be easily carried by one man. The case is of cast aluminum with hinged cover.

It consists of a small testing transformer inclosed in a cast-aluminum case and covered at the top by a Micarta panel that carries the voltmeter and the control equipment. The voltmeter, mounted flush with the panel and calibrated in kilovolts, indicates the breakdown value of the oil. The transformer is designed so as to eliminate surges in its windings.

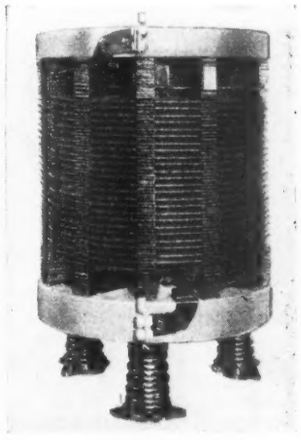
As a safety feature a push



button must be held down during tests in order to obtain voltage at the terminals of the testing cup. *Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. July 17, page 119.*

Dry-Type Current-Limiting Reactor

The reactor shown consists of a winding of disk-shaped layers of cable. Wound around a hollow concrete cylinder. The cable insulation provides protection against short-circuited turns. It possesses a high dielectric strength and is heat- and fire-resisting. The turns

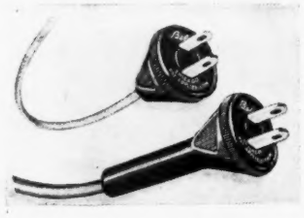


and layers of the winding are separated by vertical and radial spacers.

One end of each cable of the winding is connected to a terminal at the top of the reactor, while the other end is connected to a terminal at the bottom of the coil, all connections being welded. *Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa. Sept. 18, page 494.*

Soft-Rubber Attachment Plug

A soft-rubber attachment plug is made for use on the flexible cords of portable shop tools and other devices. The plug is practically indestructible. It is shaped

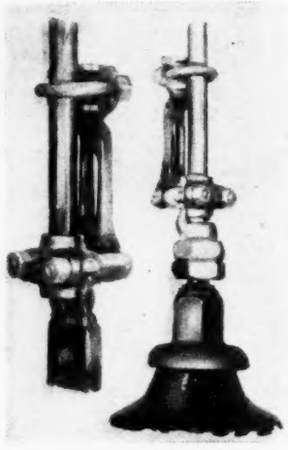


to form a convenient grip for the fingers when plugging in or pulling out, and the insulating qualities make it especially adaptable for use in damp places. The plug is made in different shapes for various uses, and cords with plug attached are furnished in 10-, 20- and 50-ft. lengths. *Belden Manufacturing Company, 2,300 S. Western Ave., Chicago, Ill. April 10, page 657.*

New Guide Clamp Stops Breakage of Conductors

The guide clamp illustrated is designed to eliminate the breaking of conductors where they are rigidly held to the connection members of oil circuit breakers, transformers and disconnecting switches. It consists of a cast arm four to six inches long, provided with holes at each extremity for bolting to the conductor and terminal. Its function is to distribute the point of flexure over an appreciable length of conductor.

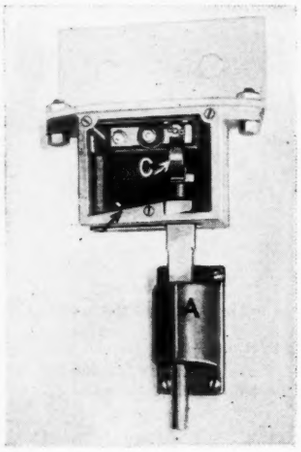
The clamp is made in a variety of sizes suitable for attachment to conductors in sizes from No. 2 up to 2½ in. iron-pipe size copper tubing,



and can be applied to the terminals of standard outdoor station apparatus and to tubular conductor connector fittings in outdoor bus work. It is made of copper alloy and is provided with hot-dipped galvanized hardware. *General Electric Company, Schenectady, N. Y. June 5, page 1029.*

Combination Lock and Contact for Elevator Doors

In this combination bar lock and contact for elevator doors, the contacts are curved in such a way that the contact circuit

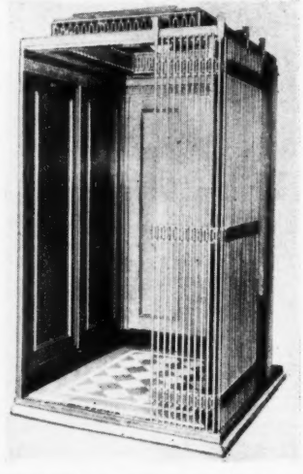


cannot be completed until the locking bar drops and secures the door in the closed position. The locking bar is extended to bring it within easy reach of the operator.

This combination bar lock and contact can be supplied for either sliding or swinging doors, complete with extension bars and guide brackets. *Maintenance Company, Inc., 449 West 42nd St., New York City. Jan. 1, 1929, page 30.*

Safety-Type Elevator Gate

This safety-type car gate consists of round tubes linked near their ends and at the center. It runs in guides at its top and bottom ends and is supported on ball-bearing hangers. It is



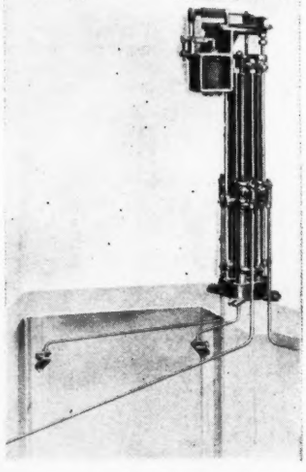
arranged to run around to the side of the car out of way of the exit. This design permits an opening equal to the width of the car. The tubes are placed with less than one inch space between them, so that they provide greater protection to the passengers than the standard pantograph gate. It is well adapted to power operation.

These gates are made with steel tubes and aluminum links, bronze plated and oxidized; solid bronze tubes with bronze aluminum links; with steel tubes and aluminum links lacquered to correspond in color with the car. *Otis Elevator Company, New York City. Feb. 7, page 266.*

Pressure-Type Guide-Rail Lubricator

This lubricator is electrically operated and, as a unit, automatically lubricates the four guide rails. Oil in four cylinders, one for each guide rail, is forced out by the downward motion of pistons and flows by gravity through copper tubes to distributors, which deliver it to the three surfaces of the rails.

A magnet coil is energized by the car closing a switch in the hoistway or by a selector switch, and this coil in turn



works a ratchet that rotates a threaded shaft to lower the plungers into the cylinders. The stroke of the ratchet is adjustable so that the amount of oil delivered to the guide rails each time the magnet switch is closed, can be changed.

The lubricator is placed in the penthouse, where it can be easily inspected and refilled without taking the car out of service. *Otis Elevator Company, New York City. April 3, page 615.*

Wick-Type Guide-Rail Lubricator

In this stationary guide-rail lubricator a square felt wick leads from the bottom of an oil reservoir up through an adjusting device and down through a tube to an oil distributor on the guide rail.

By capillary attraction and a

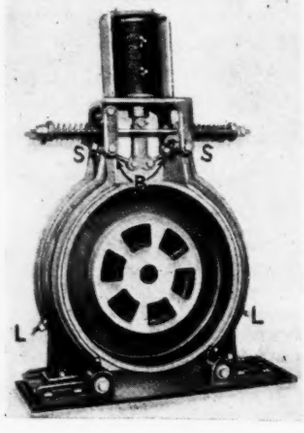
Electric-Elevator Equipment

Improvements include a vertical machine, a line of controllers, guide-rail lubricators, a safety gate and a door operator

Elevator Brakes for Wide Range of Applications

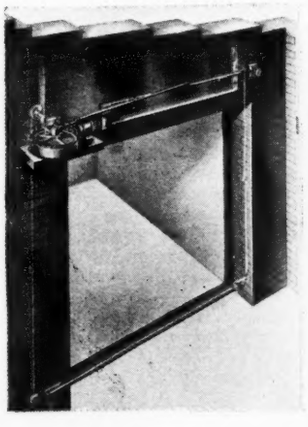
A direct-current elevator brake that can be installed in close quarters. The magnet coil is above the brake shoes and is supported on them by a flexible connection. The connections of the brake shoes to the machine's frame can be made down close to the bedplate, thus allowing the brake to be installed where the brake wheel has small clearance from the plate. The shoes are of cast iron, lined with high-grade brake leather.

The brake has been designed to replace unsatisfactory electromechanical and band brakes, which are difficult to keep in adjustment. It can also be used to replace mechanical brakes with or without conversion to electric control. *Maintenance Company, Inc., 449 West 42nd St., New York City. Jan. 8, 1929, page 66.*



siphon principle the oil flows through the wick from the reservoir to the oil distributor on the rail. From the distributor the oil flows by gravity down the rail and is distributed by the guide shoes. The rate

of oil flow to the rails is controlled by tightening down or releasing an adjusting clamp on the wick. Where the top of the guide rail is readily accessible, the lubricator can be mounted directly on the top end of the rail without the use of the flexible tubing. *Otis Elevator Company, New York City. March 13, page 484.*



Electric Elevator Door Operator

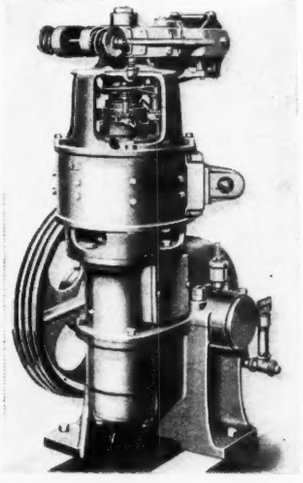
An electric operator for vertical sliding elevator doors, consisting of a totally inclosed worm gear directly connected to a motor. On the worm-gear shaft is an arm that connects to the door-operating mechanism. Limit switches are provided to stop the motor at the open and closed positions of the doors.

The operation can be made automatic, so that when the car comes within ten inches of the floor and the car switch is centered, the doors will open. Through a master interlock the car can be moved within this ten-inch zone. On micro-leveling elevators the electric operator automatically opens the doors when the elevator is in the micro zone. On installations where there are both front and rear landing doors on the hoistway, selective operation can be obtained for either door or both at the same time. *Automatic Control Corporation, Detroit, Mich. Division of the Riley Stoker Corporation, Worcester, Mass. June 12, page 1071.*

Vertical Traction Elevator Machine

In order to obtain small overall dimensions, the driving motor on this elevator machine has been placed in a vertical position and the brake placed above the outboard bearing of the motor and worm-gear housing. This machine is for capacities up to 1,000 lb. at 100 ft. per min. and occupies a floor space of 24½x19½ in. by 36 in. high.

An extra-large diameter driving-sheave shaft is used and carries the worm gear between

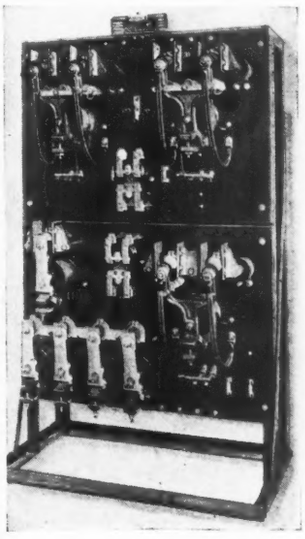


its bearings in the housing. The position of the driving sheave allows the machine to be placed either over the hoistway or in the basement without change in its design. The upper end of the worm shaft extends through the bearings in the gear housing and serves to carry the rotor or armature of the motor and also the brake drum. Either a direct- or alternating-current type driving motor may be used, which is designed expressly for elevator duty. *A. B. See Electric Elevator Company, Inc., New York City. May 22, page 923.*

Elevator Controllers for Direct-Current Service

This line of direct-current elevator controllers includes non-reversing motor starters with single-pole magnet main-line switch, full-magnetic single-speed types, full-magnetic two-speed types, and full-magnetic types with potential switch and slow-down. The contacts on these controllers are of the wiping self-cleaning copper-to-carbon type and will not weld together when subjected to heavy currents in severe starting conditions.

Acceleration is obtained by counter - electromotive - force principle, and dynamic braking is provided in the control to assist the electromechanical brake in stopping the machine. A sequence or current-interruption relay is provided on all mechanically operated controllers. This relay prevents the machine starting on return of power after a temporary interruption in the current supply, if the operator leaves the controller in the running position. Special combinations of switches and relays can be provided to meet unusual requirements and conditions. *Maintenance Company, Inc., 449 West 42nd St., New York City. Dec. 25, page 1055.*



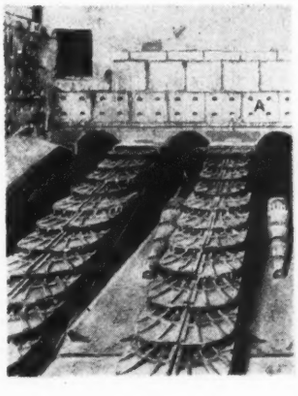
Fuel-Burning Equipment

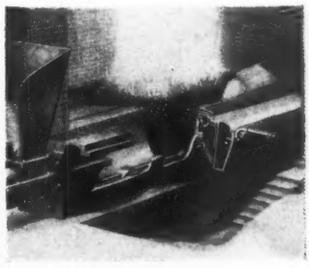
Mechanical stoker drives designed to give increased flexibility of operation, stokers of the overfeed and underfeed types for heating and small industrial boilers, and oil burners with complete synchronized control, comprise the important development in this field.

Improved Super-Stoker

Among the important improvements recently made to the Riley underfeed super-stoker is the provision for admitting air over the top of the fuel bed by means of special ported refractory blocks in the front wall, the amount of air so admitted being under the control of the operator.

Another improvement is in





the grate-block construction. In order to obtain a large coal-feeding capacity without undue wear of the moving parts, a large-diameter and long-stroke plunger has been adopted. To accommodate this large plunger four grate blocks at the front of the stoker have been made narrower and the remaining grate blocks have been widened somewhat.

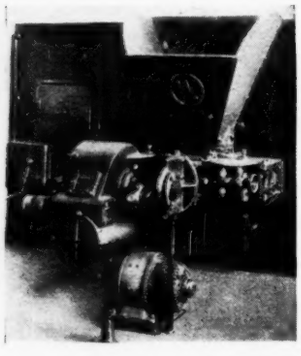
Each section of the stoker is provided with a damper, so that the operator may supply more or less air, depending on the fuel conditions at any particular point throughout the length of the stoker. These dampers are

controlled from the side wall of the boiler by means of conveniently located rods.

The clinker-grinder operating mechanism has been redesigned to provide a more variable means of control. The drive for the double-roll clinker grinder is so arranged that either or both rolls can be operated as desired, also the control for the ratchet pawl has been made independent for either grinder roll, so that the speed of one roll can be varied independently of the other. A similar principle of air zoning has also been applied to the Jones side-dump stoker. A damper is used to regulate the air supply to the overfeed section and it is adjusted from the front of the stoker by means of a bar. *Riley Stoker Corporation, Worcester, Mass. Feb. 21, page 351.*

Mechanical Drive for Single-Retort Stokers

This improved mechanical drive for single-retort stokers consists of a speed-reduction gearbox together with the necessary connections for driving

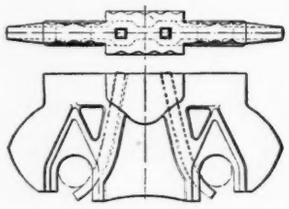


it by a suitable prime mover. It is used where the standard type of steam drive is not applicable.

The speed worm has a machined double thread and is made of casehardened steel. The speed-worm gear has phosphor-bronze machined teeth on a cast-iron spider and is mounted on the shaft with the power worm, which is a triple-thread worm cut from a steel forging. The crank is supported by three cast-iron bearings, one on either side of the power-worm gear and one outboard bearing. The gear reduction is such that the wide range of speed demanded by various size stokers may be met by moderate chain-sprocket ratios. The gear-box driving sprocket is mounted on and keyed to a flanged sleeve at the end of the speed shaft. It drives through a shearing-pin flange keyed to the shaft, thus eliminating damage from overloading or jamming. *Westinghouse Electric & Manufacturing Company, South Philadelphia, Pa. May 1, page 781.*

Replaceable Link for Chain-Grate Stokers

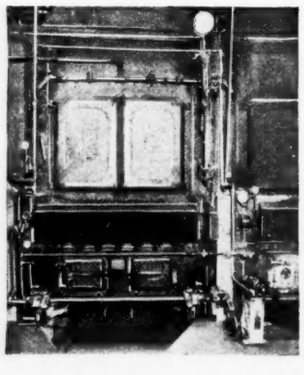
This link is of substantially the same construction as the standard link furnished by the stoker manufacturer except that the bar holes are open at the bottom, to permit dropping the



link into place without removing the bars or disturbing other links of the stoker. Two curved holes are cored in the casting, and when the link is in place square pins are driven in to lock the link to the bars. If necessary to replace this link, the pins are driven clear through and the link can then be lifted out and a new one dropped in place. *A. L. Morgan, 244 Percival Ave., Montreal, Canada. Feb. 7, page 265.*

New-Model CoKal Stoker

This improved unit, known as the CoKal-O-Matic, consists of a full mechanical stoker with the addition of automatic motor and damper control. Automatic starting and stopping are controlled by the steam pressure, which also regulates the coal feed, overfire air and the damper position. Steam jets operating at not over 5 lb. gage pressure provide turbulence



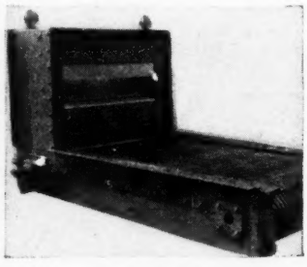
within the furnace to burn the fines in suspension.

A feature of the new coal burner is the double-retort-pusher block unit. One element of the pusher block feeds coal into the furnace while the other element is moving backward for another charge of coal. In this way a steady coal feed is maintained, and the rate of feed is easily changed by raising or lowering the connecting rod at its pivot point. The stoker bars are driven mechanically, so as to advance the fuel downward automatically at definite intervals. The frequency with which they operate is adjusted by a simple timing arrangement. When desired, the coal burner can be operated without any of the automatic features, the one position being for full-automatic, full-mechanical control and the other position being for full-mechanical, non-automatic control.

All the important factors contributing to combustion are controlled automatically; namely, the rate of coal feed, frequency of stoker-bar action, overfire air supply, steam-jet turbulation and stack damper position. All or any of these can be adjusted independently of the others. *CoKal Stoker Corporation, Chicago, Ill. Aug. 7, page 249.*

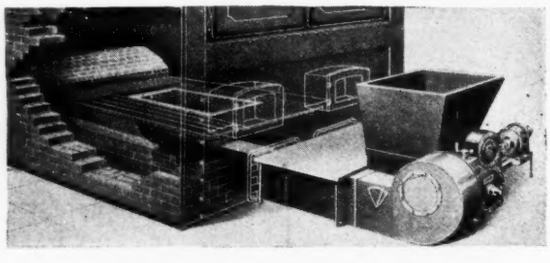
A Chain-Grate Stoker Without Ignition Arch

A chain-grate stoker designed to operate without the usual ignition arch. A magazine hop-



per is provided from which coal is fed to an over-feed grate section. After ignition the grate removes the fuel from this zone and carries it under a leveling pipe, which sets the fuel depth and levels the bed. The leveling pipe may be either air or water cooled. It is made of a special chrome-steel alloy resistant to oxidation and abrasion at high temperatures.

The stoker is designed to permit up to 200 per cent boiler rating when operating under forced draft. The windbox under the stoker is divided into three zones. Dampers are provided so that the amount of air supplied to each zone can be separately adjusted to meet the requirements of that zone.



An electric motor drives the stoker through a reduction gear and ratchet. All drive action is through steel drive chains, one on each side of the stoker, and no driving strain is exerted on the cast-iron grate links.

The stoker is built in sizes suitable for installation under all types of boilers from 500 sq.ft. of heating surface up. Installations can be applied to steel heating boilers where the maximum distance from floor line to mud ring is only 15 inches. *Boiler & Stoker Engineering Company, Grand Central Terminal Building, New York City. March 27, page 569.*

The Turbine Furnace

This furnace, which is adaptable for use under any hand-fired boiler, employs steam jets to force the air through the fuel bed. Each section is made up

of three elements: An air injector, consisting of a minute steam nozzle discharging into a venturi-shaped nozzle; an air trough of diminishing cross-section; and the grate section, consisting of a large number of individual fire bars of tapering section which are fitted into the top of the trough.

Valve control of the steam jets makes it possible to vary the draft as required. Grate sections are made 6 in. wide and up to 6 ft. long, as many sections being supplied as the width of the furnace requires. *Baker Valve Company, 1847 East 28th St., Minneapolis, Minn. Oct. 23, page 690.*

Underfeed Stoker for Small Boilers

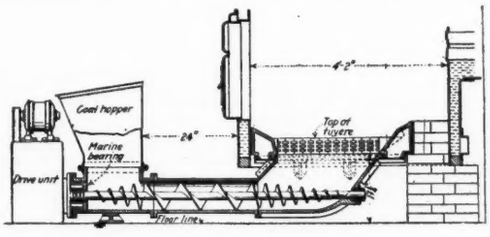
A type of stoker designed for burning the cheaper grades of coal and adaptable to boilers between 250 and 2,000 sq.ft. of heating surface.

This stoker (see picture) is self-contained in that the coal feed and forced-draft fan are interconnected and driven from a single motor. The coal is fed from a hopper to a retort within he furnace by means of a screw. Air for combustion is admitted to the fuel bed through interchangeable sectional tuyeres at

the top of the retort. The coal feed is adjustable while running, from neutral to maximum capacity. The stoker is equipped with an improved automatic control, and a forced-draft fan of the Sirocco type is used. *Combustioneer, Inc., 1829-39 South 55th Ave., Chicago, Ill. Sept. 11, page 454.*

Underfeed Stoker for Heating Boilers

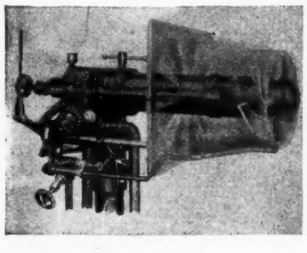
This stoker is designed especially to burn low-priced coals, such as Illinois and Indiana screenings, and for use with boilers in sizes from 150 to 600 sq.ft. of heating surface. It operates on the underfeed principle. Coal from the hopper is fed into the retort by means of a screw. The air for combustion is admitted through the tuyeres at the top of the retort. The volatile gases are distilled off and the coke formed below the incandescent part of the fuel bed.



The unit is automatically controlled, both the coal feed and forced draft being cut in and out as required to maintain the desired steam pressure. *Modern Burner Company, 1601 McCormick Building, Chicago, Ill. May 15, page 869.*

Turbine Oil Burner With Automatic Synchronized Control

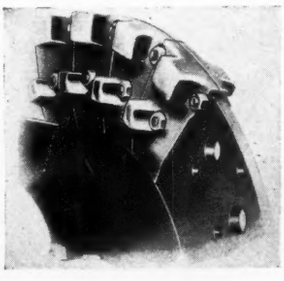
In this oil burner the controls of the oil, air, stack and gas pilot are completely synchronized and automatically operated from the lowest to the maximum point of demand. A lever connects the main control of the burner with a diaphragm regulator operated by the boiler pressure. At the burner the lever is in turn connected to the oil control, air control and to the gas-pilot control by means of links. From the same regulator a cable is carried over suitable pulleys to a counterweighted lever on the stack damper. Thus all the various controls are synchronized and operated by variations in the steam pressure.



Auxiliary or secondary air is supplied through a duct surrounding the burner. The direction of the flow of this auxiliary air is opposite to that of the main air current projecting the oil. This reversal of direction is accomplished by means of deflecting vanes at the nozzle point. This tends to give a longer flame travel and a more intimate mixture of atomized oil and air. The burner is designed for the use of high- or low-pressure boilers and for use with oil from 14 deg. Baumé up. *Bunting Iron Works, 820 Parker St., Berkeley, Calif. Sept. 4, page 418.*

Improved Atrita Unit Pulverizer

With a view to securing greater reliability, smoother performance and lower maintenance, improvements have been made in the pulverizing elements in this pulverizer. The round pegs formerly used have been replaced with small cast segments, which are bolted to the rotor. The face of the casting acts as the wearing plate and thus prevents the rotor itself from wearing. The unit castings are made with a pressed steel ferrule which fits into a bored hole in the rotor. The ferrule section of the segments takes all the centrifugal strain.

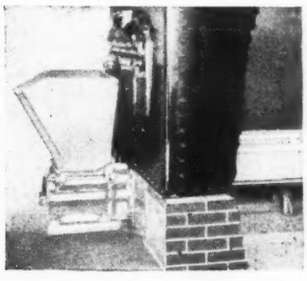


The rotor of the first effect has been increased in diameter, and the hammers are much shorter than formerly. The coils used in the magnetic separators have been entirely enclosed to eliminate the possibility of fuse wire and fine coal getting into the separator. The method of supplying preheated air to the pulverizer has also been redesigned to give more effective use of hot air and thereby facilitate the use of high-moisture coals. *Riley Stoker Corporation, Worcester, Mass. April 17, page 697.*

Underfeed Stoker for Low-Set Boilers

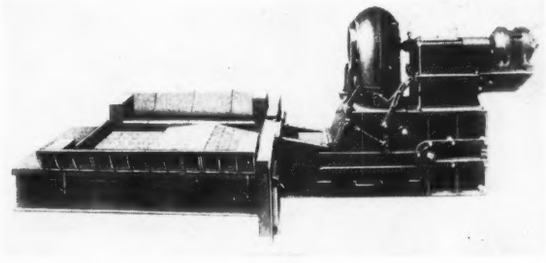
This underfeed stoker is designed especially for installation under unusually low-set and internal firebox boilers, with little or no change in the present setting.

The stoker, which is arranged to be driven by either an electric motor or steam, employs a reciprocating ram to feed the fuel into the furnace and an independent motor-driven fan for supplying the forced draft. The fan can be connected in the front or at the rear as desired. *Auburn Stoker Company, Auburn, Ind. Feb. 28, page 383.*



Overfeed Stoker for Small Boilers

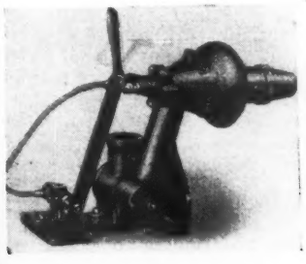
A stoker of the overfeed type especially adapted to firebox and sectional boilers requiring coal feeds up to 500 lb. per hour or with a maximum capacity of 5,000 lb. of steam per hour. The stoker is built unusually strong with certain reciprocating parts made of cast steel.



The driving parts are inclosed in an oiltight dustproof housing, and the fan for supplying the air and the motor for driving the complete unit are mounted on the top of the stoker frame. A special interlocking connection is provided between the coal and air supply so that the relation between the two will remain fixed with the variation of the load. Provision is made to allow the use of natural draft at low ratings. *Joseph Harrington Stoker Company, Harvey, Ill. Feb. 28, page 383.*

Mechanical Atomizing Oil Burner

Ability to atomize properly fuel oil of 14 to 16 deg. Baumé at a temperature of as low as 100 deg. F. and to handle the heaviest oil at 130 deg. F. are features of this oil burner. The burner carries inside its nozzle a cone-shaped cup mounted on ball bearings. The cup is made to spin rapidly by an air turbine. Oil passes through a central spindle, drips into the cup, is spread out in a thin film on the inside surface of the cup by centrifugal force, and is thrown off at the open periphery in the form of a fine mist. Low-pressure air from the turbine picks up this oil spray and carries it to the furnace.



The removal of the burner from the furnace is accomplished by pulling the handle back and swinging the nozzle away from the furnace on the two pivoted links which form the supports. The forward link, which forms a conduit for carrying the air to the nozzle is provided with a register at its lower end, which closes off the air whenever the nozzle is withdrawn.

A combined motor-driven fan and pump, furnishes air and oil to the burner. The fan is of the centrifugal type and capable of delivering air at 6 to 16 oz. per sq.in. The oil pump is of the gear type and is driven through a worm and gear on the fan-shaft.

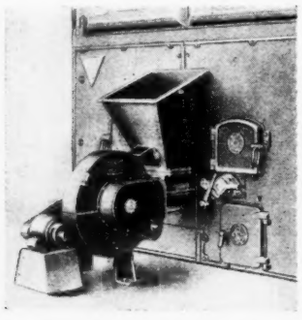
Two sizes of fan and pump sets and one size of burner are at present available. No. 1 fan

set has a capacity, with a single burner, of 4 to 20 gal. per hour, and with a double burner, 7 to 35 gal. per hour. The corresponding figures for the No. 2 set are 5 to 25 gal., and 9 to 45 gal. respectively. These ratings are based on a motor speed of 3,500 r.p.m. and 14 to 16 deg. Baumé oil that is heated to 130 deg. F. *Trowbridge & Schellens, 6 Beacon St., Boston, Mass. Aug. 14, page 288.*

Riflex Mechanical Drive for Jones Stokers

A mechanical drive for the Jones underfeed stoker, known as the "Riflex," designed to give a variable coal feed with a constant-speed motor as well as to obtain a quick thrust of the plunger so as to give an effective slicing action to the fuel bed.

A large spur gear, is driven by a constant-speed motor through a chain and back gear, and a timing mechanism functions to regulate the speed of the coal feed, giving a range of capacity between 60 and 6,000

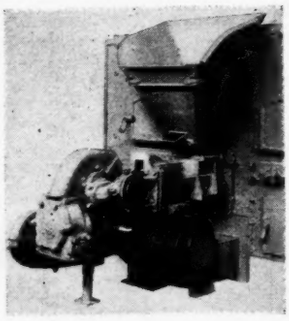


lb. of coal per hour. At maximum speed a complete stroke of the plunger is made in less than four seconds, and at the slowest speed a stroke is made every twelve or fifteen minutes. Spur gears only have been used for the speed reduction, and the design of the timing adjustment is such as to make it adaptable to automatic regulation by means of a regulator operating from the steam pressure. *Riley Stoker Corporation, Worcester, Mass. Nov. 20, page 849.*

Improved Jones Stoker Unit

The combining of the fuel-feeding mechanism, the forced-draft fan and the driving motor into one unit, constitutes important improvements made to this stoker.

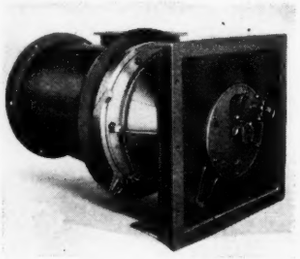
The fuel-feeding mechanism is the same as that used on the Riley underfeed stokers. The driving motor and forced-draft fan are assembled with the fan direct-connected to the motor shaft. The other end of the motor shaft carries the silent-chain drive for the stoker, the



motor and chain being inclosed in a dust-tight cover. The stoker is self-contained, and the necessity for a separate fan foundation and drive, and the building of an air duct to connect the fan with the air chamber is obviated. *Riley Stoker Corporation, Worcester, Mass. April 3, page 615.*

Insulated Front for Pulverized Coal and Oil Burners

This pulverized coal burner is fitted with an insulated front to obviate heat radiation to the firing aisle from the burner or the preheated air supplied to the burner. In the design shown the forced-draft air duct is connected between the flange on the outer end of the burner and the insulated front. The control



for the air register vanes is extended and arranged conveniently on the outside.

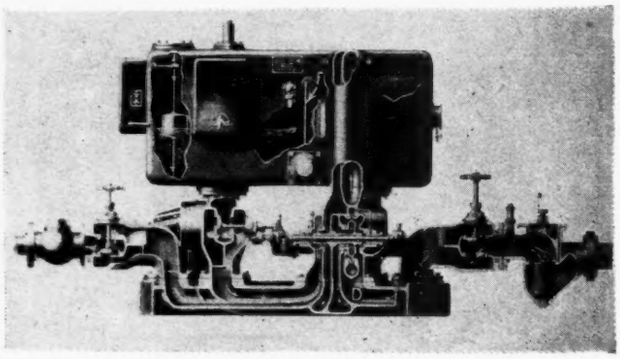
This front is adaptable to use with the pulverized coal burners, oil burners, and the combined pulverized coal and gas, or the combined pulverized coal and oil burners, made by this company. *Peabody Engineering Company, 110 E. 42nd St., New York City. Feb. 28, page 383.*

Heating and Ventilating Equipment

A heating system controlled automatically by the weather, a centralized control for a zoned orifice system, refinements in return line pump design, and new models of unit heaters and humidifiers represent recent contributions to this field.

Return-Line Vacuum and Boiler Feed Unit

Simplicity and accessibility, with compactness of design, are features of this combined return-line vacuum and boiler-feed unit made in single and duplex types. The unit is designed for use with heating systems that re-



quire a 5- to 10-in. vacuum, or a fixed vacuum differential, where a vacuum of 20 to 25 in. is carried.

The illustration shows the duplex unit, which consists of a combined motor-driven condensate and vacuum pump with separate boiler-feed impeller on one shaft and a two-compartment receiver with automatic control.

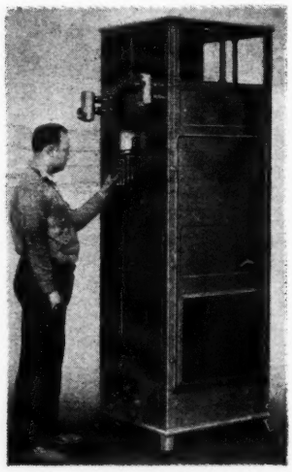
The pump is of the multi-rotor centrifugal type, with a vacuum-producing element and boiler-feed impeller running in separate chambers. The vacuum element consists of an impeller combined with a centrifugal Venturi ejector nozzle at its periphery, with diffuser plates inserted in the pump casing. The impeller is supplied with injection or hurling water from the receiver.

All internal parts of the pump, such as impellers, sealing rings, distance sleeves, packing glands, distributing valves, etc., are of Government bronze, and the injector nozzle and diffuser plates are of gun metal. The motor and pump are direct-connected through an all-metal lubricated flexible coupling of special design having floating space to compensate for expansion due to varying temperatures of condensate.

The unit is automatically controlled by a vacuum regulator and float switch mounted on the receiver. Units in single and duplex types are available in capacities suitable for 12,000 to 150,000 sq.ft. of radiation. *Ames Pump Company, Inc., Division of the Staten Island Shipbuilding Company, 90 West St., New York City. May 22, page 921.*

Unit Air Conditioner

The unit, illustrated, which is portable and self-contained, is designed to wash the air, to reduce or increase and control the atmospheric humidity, to heat or cool the air according

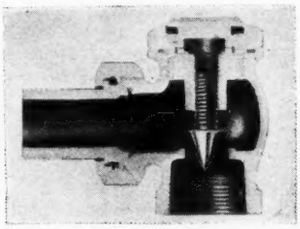


to requirement and to circulate it uniformly through the rooms to be conditioned.

It consists of a centrijector with spray nozzles, a fan to draw the air through the spray, eliminators to remove the entrained moisture from the air and heaters to raise the temperature of the air to the required point. The centrijector serves the purpose of a pump and discharges water through a series of six spray nozzles mounted at the top of the tube.

The air is drawn into the unit by means of a fan, directly below the level of the spray nozzles. From the fan the air passes through the eliminators and then through an extended surface heating element. Automatic humidity and temperature control instruments are provided with each unit to meet the particular installation requirement.

The unit illustrated has a capacity of 2,500 cu.ft. of conditioned air per minute. The cabinet is 2 ft. 6 in. by 2 ft. 8 in. and 7 ft. 8 in. in height. *Carrier Engineering Corporation, 750 Frelinghuysen Ave., Newark, N. J. April 24, page 739.*



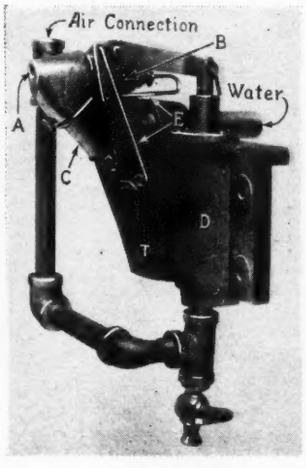
Broomell Hot Water Flow Control Fitting

An adjustable cone-shaped valve for controlling the circulation to radiators in hot-water heating systems, domestic hot-water or ice-water circulation systems.

The fitting has the same roughing in dimensions as the standard union elbow, so that the installation of the fitting on systems already in use is readily made. The regulation of the flow is by adjustment of a cone-shaped valve. The upper end of the stem is slotted to take a screwdriver, and access is had to it through a removable cap in the bonnet. The fitting is available in the standard pipe sizes from ¼- to 2-in. *Vapor Heating Company, York, Pa. Oct. 16, page 648.*

Small Humidifier Unit

Simplicity and small size are features of this humidifier unit. It requires no power other than

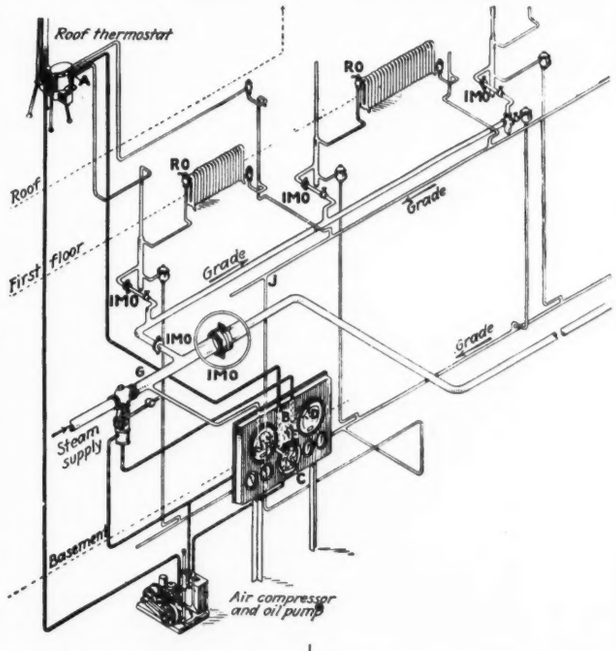


the compressed air which is used to atomize water supplied to the nozzle. Cleaning needles operated automatically by means of an air cylinder enter the nozzles each time the unit is shut down. This cleaning feature tends to eliminate clogging and corrosion of the nozzles.

Control of the unit is obtained through a humidistat, and independent regulation is accomplished by means of an adjustment screw at the outer end of the clean-out needle. Each unit can be adjusted to atomize up to 150 lb. of water an hour, depending upon available air and water pressure, and a number of units can be grouped to give any capacity desired. *Midwest Filters, Inc., Bradford, Pa. Jan. 8, 1929, page 68.*

Webster Moderator System of Steam Heating

The "Moderator System" is designed to vary the steam supplied to the entire heating system and to all parts of it in accordance with changes in demand resulting from changes in weather and occupancy conditions. The equipment gives fully automatic regulation of steam supply for changes in outside temperature. It compensates for radiation shut off by hand, for variations in pressure of steam supply and vacuum in the return lines. Manual control is also provided so as to permit quick heating up and to prevent overheating during the night load.



The illustration shows the various pieces of equipment required by this system. The compressor furnishes air at constant pressure to a roof thermostat which regulates the air flowing to the control panel according to the outside temperature. This air continuously discharges through a restricted opening with the result that a pressure is maintained ahead of the opening that is proportional to the outdoor temperature and equal to the pressure difference that should exist between supply and return of the system in order to provide proper heating. This air pressure is applied to a mercury balance that actuates an oil pilot valve. Oil supplied by a pump built into the air compressor passes through the pilot valve to the operating piston of the main steam supply valve, opening or closing it until the pressure difference in the system is equal to the air pressure ahead of the restricted air discharge.

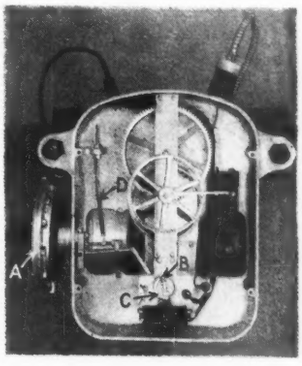
Metering orifices installed at each radiator and in the various branch lines set up sufficient resistance so that each section is supplied with a steam flow proportional to its requirements. Thus, with the pressure difference between supply and return controlled by outside temperature, all parts of the system receive only the amount of steam required for proper heating under the existing weather conditions. *Warren Webster & Company, Camden, N. J. Jan. 15, 1929, page 101.*

Improved Electric Control for Heating System

The purpose of this equipment is to permit the engineer to regulate from a central point the amount of steam supplied to various sections of a zoned orifice heating system. The control will maintain the desired steam flow to the various zones irrespective of variations in pressure of the steam supply.

Recent improvements made to this control have resulted in making it more sensitive to low pressures. The combined effect of these changes has been to improve the steam regulation at light loads, under which condition the greatest savings are to be obtained.

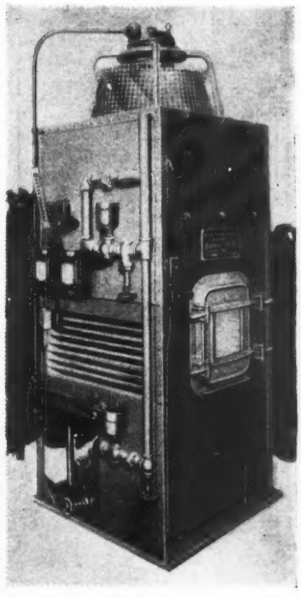
The motor driving the valve-operating mechanism is a universal, series-wound, split-field motor fitted with a governing



arrangement designed to hold constant speed. With this combination it is possible to set the governor to maintain almost any desired constant speed. The speed is usually adjusted so that the steam valve will completely open or close in fifteen minutes. *Webster Tallmadge & Company, Inc., 50 Church St., New York City. Jan. 15, 1929, page 104.*

Unit Humidifier

This Type I humidifier offers in one unit a heater and humidifier, or if provided with a cold-water connection, a dehumidifier. Conditioned air is discharged from the top of the unit in all horizontal directions by a centrifugal-type fan designed with



a self-limiting horsepower characteristic, to prevent overloading the motor.

The units are built in two types and eight sizes, capable of handling from 1,200 to 5,500 cu.ft. per min. *Clarage Fan Company, Kalamazoo, Mich. Sept. 18, page 494.*

Tempervane Heating Units in Suspended and Floor Types

Suspended and floor types comprise this line of heaters, which have been designed to provide a flexibility of installation that will cover practically every requirement.

The heating element is the standard "Aerofin" suitable for

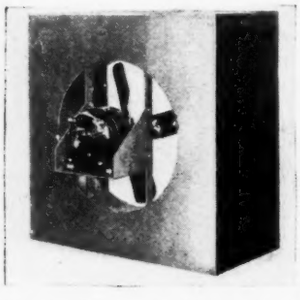
pressures up to 350 lb. The air is passed through the unit by one or more motor-driven propeller-type fans designed to give a comparatively flat horsepower curve which makes the unit virtually self-limiting in horsepower characteristics.

The motor driving the fan is of the totally inclosed type with special dustproof, grease-packed, thrust ball bearings.

The outlet is built for one-, two-, three- or four-way discharge, and a large diffusing chamber is provided between the fan and the heating section in order to permit uniform distribution of the air over the heating surface. In installations where a steam pressure below 50 lb. is required, a low-pressure heating element can be used. *B. F. Sturtevant Company, Hyde Park, Boston, Mass. Nov. 6, page 773.*

"Chinookfin" Unit Heater

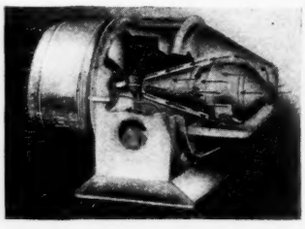
In this unit heater each tube is an individual radiator and is free to expand or contract separately from other tubes in the heater. The radiating surfaces are copper tubes having extended copper fin surfaces. Each radiating tube is expanded into a special bushing and belled at the end. The bushing is then screwed into place in the



base casting, the other end of the tube being supported in a channel permitting free movement of the individual tubes. The complete radiating section is inclosed in a welded steel casing with a fan mounted motor-driven disk. *Bayley Blower Company, 732-753 Greenbush St., Milwaukee, Wis. May 29, page 993.*

Explosion-Proof Ventilating Unit

An explosion-proof ventilating unit adjustable for four mounting positions. The motor is fully inclosed and is located

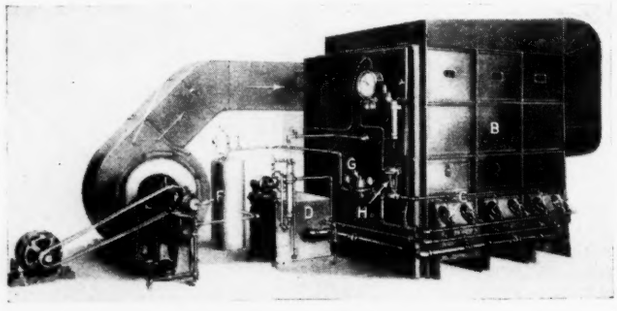


outside of the path of the dangerous fumes.

The unit is made in four sizes, ¼, ½, 1 and 2 hp., giving respectively, displacements in cubic feet of free air per minute of 2,700 to 3,200, 2,250 to 5,000, 8,000 to 10,000 and 14,000 to 16,000. *Paasche Air Brush Company, 1909 Diversey Parkway, Chicago, Ill. Nov. 13, page 811.*

Self-Contained Oil-Fired Heater

This self-contained, automatically controlled oil-fired heater is especially adaptable for industrial plant heating where a steam boiler plant would not be required for service other than supplying heat to the building. It is also adaptable as an interchanger for use where waste gases are available from kilns, furnaces, etc.



The unit has a motor-driven fan for supplying cold air to the heater, combined combustion chambers and heating elements, oil burners and auxiliary control equipment. An auxiliary fan is also used to furnish the necessary draft and recirculate the products of combustion around the heating elements.

The combustion chamber, consists of one or more sections each comprising a heavy steel frame lined with special shaped refractory tile and fitted with two oil burners as shown. Each heating element consists of a number of interlocked special shaped tubes. The heating surface is proportioned so that the required maximum air delivery temperatures are obtained with the gases not above 900 deg. F.

The burners are of the air atomizing type, using compressed air at 5 to 20 lb. pressure. An automatic governor driven from the fan shaft and operating a valve in the compressed-air line, serves as a safety governor to close the air valve whenever the fan stops, thus protecting the heater against excessively high temperatures. A pressure regulating valve and a thermostatically controlled valve are incorporated in the air line to the burners.

The heater is also adaptable for practically all classes of low-temperature drying, delivering heat for this purpose at temperatures up to 200 deg. F. It is likewise available, completely equipped, for using gas instead of oil as fuel. *Clarage Fan Company, Kalamazoo, Mich. June 26, page 1158.*

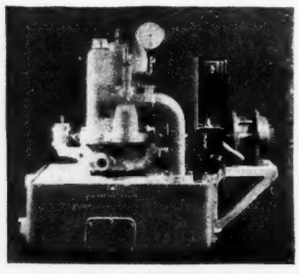
Equiflo Radiator Valve for Forced Hot-Water Heating Systems

This valve is designed to give a simple method of equalizing the frictional resistance in the piping to each radiator of a forced-circulation hot-water heating system and thus give a balanced circulation at all temperatures of water.

The valve outlet is fitted with a tube in which are inserted a series of orifices and baffles, designed to give the proper resistance to the flow with an open valve and independently of the size of the pipe leading to the radiator. The tube is extended into the valve seat to hold it tightly in position, and the large size of the orifices preclude clogging. The required orifices and baffles for each radiator are determined by the company's engineers from the contractor's plans, and after the system is completed the tubes are inserted by removing the valve bonnets and dropping them into place. An illustration of this valve will be found among the equipment shown in the special insert in this issue. *Grinnell Company, 260 West Exchange St., Providence, R. I. Jan. 15, 1929, page 105.*

"Condo-Vac" Vacuum Pump

A new condensation vacuum pump, known as the "Condo-Vac," in which an air impeller for exhausting the air from the

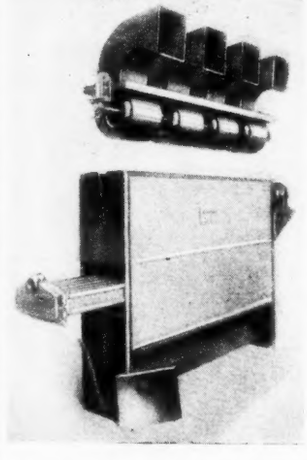


system and an impeller for discharging the water to the boiler are mounted together in one horizontally split casing. The unit is compactly designed, the 8,000-sq.ft. unit requiring only 28x48 in. The pump is made in a range of sizes suitable for 8,000 to 65,000 sq.ft. of direct radiation. *Chicago Pump Company, Chicago, Ill. Feb. 28, page 389.*

Sirocco Unit Heaters

This line includes industrial unit heaters for floor and ceiling application in both high- and low-pressure types. The fan assembly is readily removed from the heater as a unit.

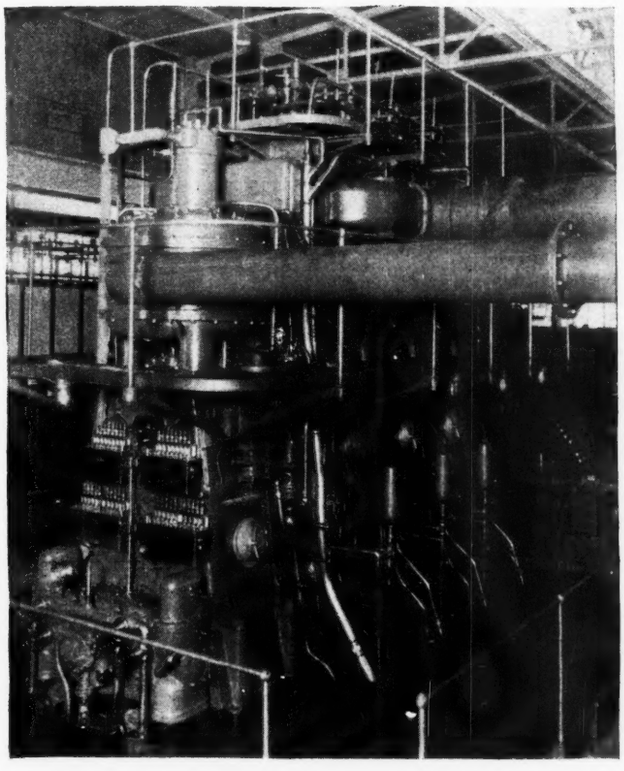
The heating element is composed of staggered rows of ¾-in. copper fin tubes expanded into one-piece cast-iron headers. The unit can also be furnished with pipe-coil heating elements if desired. In each case the element is readily removable. A "Mer-



coid" thermostat can be arranged to start and stop the motor. The unit can also be used to ventilate. *American Blower Corporation, Detroit, Michigan. Jan. 8, 1929, page 67.*

Internal-Combustion Engines and Accessories

Designers are producing engines, both gas and oil, for high-speed operation. Accessories, such as compressors and cooling towers have been given more attention.



Double-Acting Two Cycle Diesel

This double-acting 16x22-in. two-stroke-cycle air-injection Diesel is designed to deliver 300 hp. per cylinder at 165 to 180 r.p.m. Each cylinder assembly is supported on two A-frames, the assembly being made up of an upper cylinder jacket, an exhaust belt and a lower cylinder jacket.

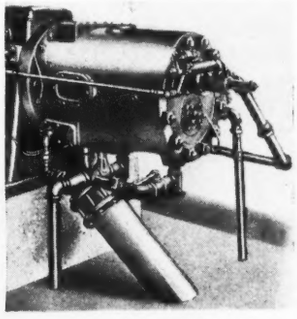
Within the two jackets are inserted the liners, which join at the exhaust belt with a male-and-female joint. There is enough clearance at this point to care for all the elongation occurring when the engine warms up.

The outstanding feature of the cylinder design is the arrangement of the scavenging and exhaust ports. The scavenging ports are placed about one-half of the cylinder circumference, the other half being taken up by the exhaust ports. Cages hold steel strips which act as the air valves. These strips remain seated until the piston has uncovered the exhaust slots and the cylinder pressure has dropped to below two or three pounds, this pressure being that carried in the scavenging air compartment. When this pressure is reached, the valves open and the scavenging air flows out and passes along the proper deflectors into the cylinder. *Sun Shipbuilding & Dry Dock Company, Chester, Pa. Sept. 11, page 442.*

Corliss Valve Gear for Two-Stroke-Cycle Gas Engines

A device for injecting gas under pressure into the cylinder of a two-stroke-cycle gas engine, consisting of a valve mounted in a suitable cage and placed horizontally in the upper half of the power cylinder head. The same type of power cylinder is used as in the case of the standard two-stroke-cycle engines, but only air is admitted through the inlet ports. This air displaces the gases and leaves the cylinder filled with pure air only, at the beginning of the compression stroke.

As soon as the exhaust ports have been closed and there is no chance for fuel to escape, the injector valve in the cylinder head opens and admits the charge of fuel gas under about 15 lb. pressure. As the gas enters the cylinder, it mixes with the air which has been admitted through the inlet port. The gear is of the standard Corliss type, and governing is effected by throttling the fuel gas. Under normal operating conditions the injection pressure is around 15 lb., but under light load the fuel will be throttled down to seven or eight pounds. *Bessemer Gas Engine Company, Grove City, Pa. March 20, page 529.*

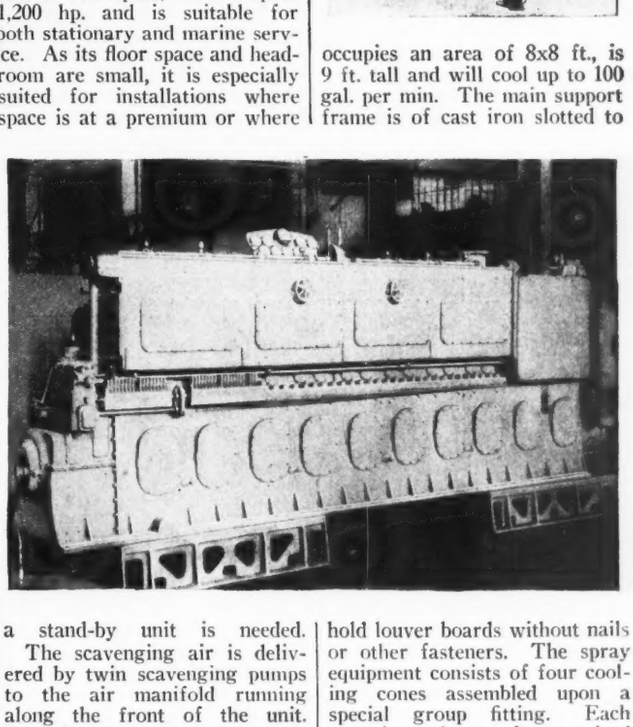


Large High-Speed Diesel Engine

This type E two-stroke-cycle air-injection engine, which operates at 300 r.p.m., is built up to 1,200 hp. and is suitable for both stationary and marine service. As its floor space and headroom are small, it is especially suited for installations where space is at a premium or where a stand-by unit is needed.

The scavenging air is delivered by twin scavenging pumps to the air manifold running along the front of the unit. The air enters the working cylinders through strip-type air valves. Similar valves are used on the scavenging pumps. The exhaust ports connect with a water-cooled manifold placed along the rear of the engine frame.

The fuel pump, mechanical lubricator, governor and fuel-priming pump are placed at the flywheel end. The mechanical lubricator has a separate plunger for each feed to the working and compressor cylinders, provision being made for lubrication at four points on the circumference of each working cylinder. *Busch-Sulzer Bros. Engine Company, St. Louis, Mo. July 24, page 144.*

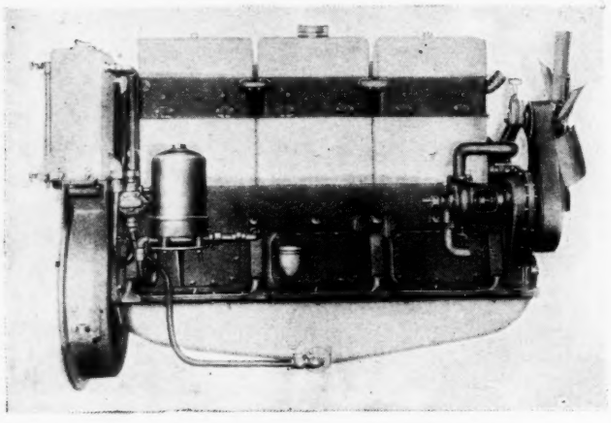


Marley Unit-Type Spray Cooling Tower

A spray cooling tower particularly adapted to ice-plant, oil-engine and similar installations, where small quantities of water must be cooled continuously.

The tower, when assembled, occupies an area of 8x8 ft., is 9 ft. tall and will cool up to 100 gal. per min. The main support frame is of cast iron slotted to hold louver boards without nails or other fasteners. The spray equipment consists of four cooling cones assembled upon a special group fitting. Each cone is made up of a standard open-type nozzle within an open cylinder. When the nozzle op-

erates, the upward flow of water induces an upward flow of air through the cylinder, thus improving the circulation of air within the tower. The capacity of any tower is readily varied to suit installation requirements by a change of nozzle size. The tower comes as a complete unit ready for operation. *Power Plant Equipment, of Kansas City, Mo. March 20, page 527.*



Six-Cylinder Light-Weight High-Speed Diesel

A high-speed light-weight full Diesel engine especially suitable for driving electric generating units, locomotives, compressors and similar equipment. The engine is a six-cylinder ($6\frac{1}{2}$x $8\frac{3}{4}$-in.) designed to run at 1,000 r.p.m. and develop 180 hp. The over-all length is 89 in., the height is 58 in., and the weight without clutch, approximately 5,400 lb.

The engine is of the airless fuel-injection type, and compressed air is not used either for starting or running. The unit is started by means of a small two-cylinder gasoline engine mounted on a bracket cast on the flywheel housing. The engine is fully equipped with fuel oil, lubricating oil and air filters, and fuel having a Baumé gravity of 26 to 38 can be used. *Buda Company, Harvey, Ill. Jan. 15, 1929, page 105.*

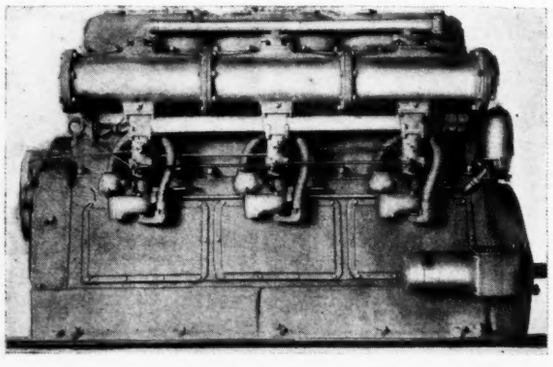
Sterling Large Gasoline Engines

Built in six- and eight-cylinder units with 8-in. bore, 9-in. stroke, this engine develops, in a six-cylinder model, 425 hp. at 1,200 revolutions and 565 hp. in the eight-cylinder unit at the same speed. The crankshaft is 4-in., with extra long bearings, having a total effective length of $22\frac{1}{4}$ in. in the six-cylinder model.

The cylinder casting is a long water jacket in which the cylinder walls are inserted. The cylinders project down into the upper crankcase so that the piston is guided the full length of the stroke. The cylinder heads are made in pairs and can be detached without disconnecting the exhaust line or the fuel piping or manifolds. Dual valves are used in the head.

A full force-feed oiling system is employed to all main, connecting-rod and camshaft bearings and to the piston pins. The oil is forced through a cooler attached to the side of the cylinder block and also strained through oil purifiers.

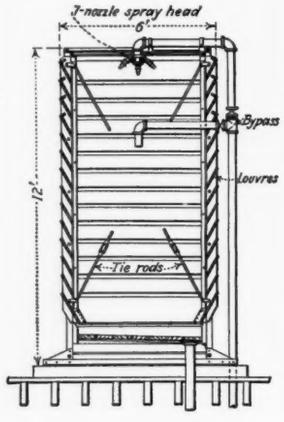
The ignition can be provided for either 12 or 32 volts and consists of four distributors, each firing four spark plugs per cylinder, two on each side. Three carburetors are used for the six-cylinder engine and four for the eight-cylinder engine. *Sterling Engine Company, Buffalo, N. Y. May 15, page 870.*



Spray Cooling Tower

This tower is especially adaptable for small refrigerating plants having capacities from one to twenty tons of refrigeration and for cooling jacket water for Diesel engines, compressors and other apparatus where the capacity does not exceed 100 gal. per min. A combination of the spray system and atmospheric cooling-tower principles are employed. An inverted spray head with seven nozzles, placed at the top of the tower, directs the water downward against the louvers, a pressure of 7 to 10 lb. being used at the nozzles.

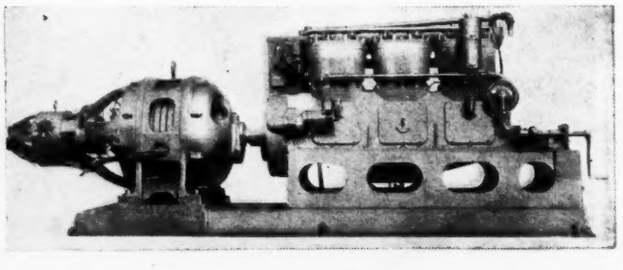
All metal beams, cross-members and tierods used in the construction of the tower are of

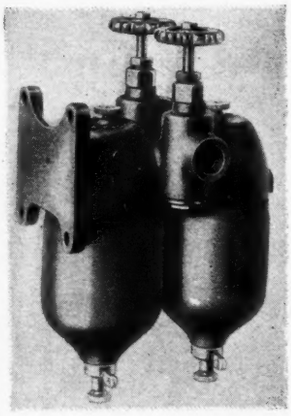


extra-heavy galvanized steel, and all woodwork is of cypress. The four corner posts with cross-members and tierods comprise the skeleton frame into which the louvers are dropped into position. When all louvers are in place, the tierods are tightened and the structure made rigid. *Binks Spray Equipment Company, 3114 Carroll Ave., Chicago, Ill. June 5, page 1029.*

Fuel-Oil Filter

The filter illustrated, which is made in the single and duplex types, requires a comparatively small space and has capacity to filter sufficient oil of 21 deg. Baumé, at 60 deg. F. under 5 lb. pressure for a 1,000-hp. Diesel engine, or for a 4,000-hp. engine under 25 lb. pressure. The





filter is designed to be attached to the engine frame and to be incorporated in the fuel supply between the oil tank and the engine pump.

The duplex unit consists of two filtering chambers with the control valves placed between them. Each valve has a double seat and disk and is double-ported, so that to cut out one element both valves are screwed up and for the other both valves are screwed down.

The filtering elements, of which there are three in each chamber, consist of series of brass washers mounted on spindles and separated by alternate spaces only 0.0035 in. thick. The filtering elements are cleaned by back washing. With the duplex type one side can be cleaned while running the other. *Zenith-Detroit Corporation, Detroit, Mich. July 31, page 209.*

Model R6U Engine with Generator and Exciter

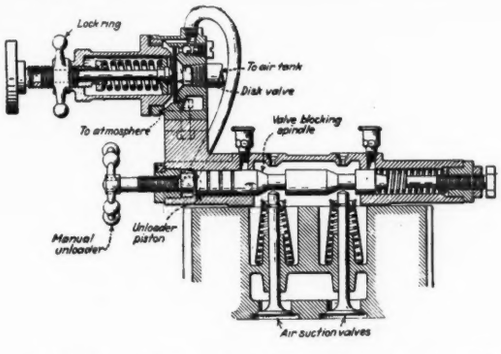
The engine shown is a 6x7-in., 140-hp. unit direct connected through a rubber-cushioned flexible coupling to a 75-kw. three-phase 60-cycle 240-volt generator with direct-connected exciter. The engine is mounted on cast-iron side rails, which in turn can be set on a concrete or cast-iron sub-base.

The engine can be supplied with or without radiator cooling and with a water-cooled exhaust manifold. It is also equipped with an electric starter and with dual ignition, both battery and magneto. *Climax Engineering Company, Clinton, Iowa. April 17, page 697.*

Unloader for Diesel-Engine Compressor

An automatic air-compressor unloader for use with Diesel engines where the compressor is direct connected to the engine.

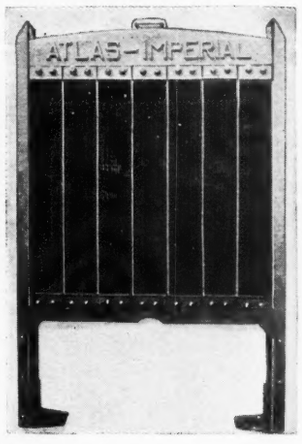
The unloader has two main parts, a pilot valve connected to the starting air tank, and a suction-valve blocking mechanism on the compressor. The device for holding open the suction valves is the same as the one furnished for manual cutouts, but is capable also of being operated by air pressure communicated from the pilot. A handwheel with a screw is provided for holding the unloaded piston in the cutout position for throwing the compressor out of action independently of the



pilot. *Fairbanks, Morse & Company, Chicago, Ill. July 24, page 163.*

Radiator-Fan Unit for Diesel and Gas Engine

A radiator for Diesel and heavy-duty gas engines available in sizes from 50 to 350 hp. An unusually large air-circulating fan is mounted directly on the radiator frame and is shrouded to insure uniform air circulation over the entire surface.



The radiator incorporates the latest developments in removable core sections, a feature that permits removal and repair of any individual section without dismantling, and allows continued operation for reasonable periods while a section is out. *Perfex Corporation, Milwaukee, Wis. Oct. 30, page 731.*

Mechanical Transmission

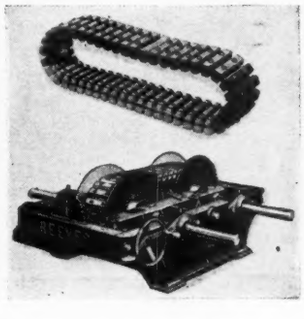
Speed reducers; Flexible Couplings and Bearings.

Improved Variable Speed-Transmission

Recent improvements made to this transmission include the adoption of a double-block center-pull V-belt and the redesigning of the frame to make the unit more compact.

The double-block V-belt distributes the load more evenly and gives increased contact area, so that the belt can be run with less tension.

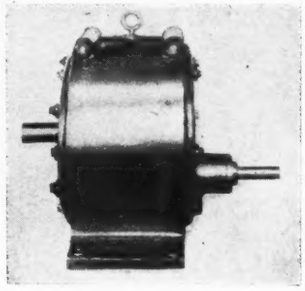
The over-all length and width of the frame have been reduced by mounting the bearing housing inside the recesses of the frame sides. This brings the housings closer together on the shaft. The force-feed system of lubrication has been changed to give a better distribution of the lubricant to each bearing. *The Reeves Pulley Company, Columbus, Ind. March 6, page 442.*



Helical-Gear Speed Reducer

An important feature of this speed reducer is the quick adjustability of the high-speed shaft to any level to suit the motor to which it is to be coupled.

Steel helical gears are used with a ball radial-thrust bearing on each end of each shaft. The slow-speed shaft is located in the center, with each of the

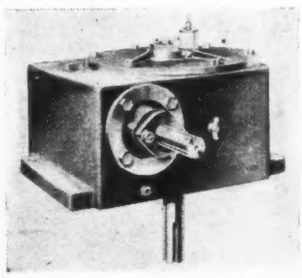


countershafts, including the high-speed driven shaft, midway between the center and the outside on a common center circle.

The complete gear train is carried between two disks which are clamped in the housing by means of two clamp bolts at the top. The adjustment of the high-speed shaft is accomplished by loosening these clamp bolts and turning the gear assembly to bring the high-speed shaft to the desired level or position, then locking it there. The gear and bearing assembly is completely inclosed by end covers which bolt to the bearing disks. *The Morrison Machine Company, Paterson, N. J. March 13, page 483.*

Improved Vertical-Type Worm-Gear Speed Reducer

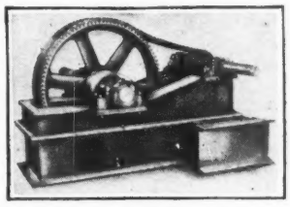
An improved vertical type heavy-duty worm-gear speed reducer that is made to allow for vertical driving, with the driveshaft projecting at the top or bottom. The worm is made



integral with the shaft of chrome nickel steel. The gear is of high-grade phosphor bronze with the larger sizes made up of a bronze ring, shrunk on and keyed to a cast-iron spider. *D. O. James Manufacturing Company, 1120 West Monroe St., Chicago. Oct. 30, page 732.*

Silent-Chain Speed Reducers

Ability to absorb shock and ease of changing the speed ratios are features of this line of silent-chain speed reducers. Both single and double-reduc-



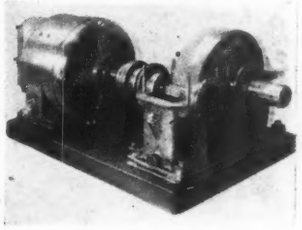
tion units are built, the latter unit consisting of either two chain drives in series or a single chain drive with a spur-gear drive. Speed reductions up to ratios of 10 to 1 can be supplied, though for ratios of more than 7 to 1 a double-reduction unit is recommended. *Morse Chain Company, Ithaca, N. Y. Jan. 8, 1929, page 67.*

Helical-Gear, Right-Angle Speed Reducer

The unit embodies the standard helical-gear speed reducer deescribed on this page with a slow-speed right-angle drive added. With this unit not only is the high-speed shaft adjustable to any position, but the slow-speed shaft *D* is also adjustable to any one of eight positions, these being vertical above and below, horizontal on either side and at 45 deg. from the horizontal in any direction. Anti-friction bearings are used throughout, and the elimination of stuffing boxes is accomplished through the adoption of a special oil seal. The unit is made in ratios from 6 to 1 to 1.458 to 1. It is illustrated in the special insert. *Morrison Machine Company, Paterson, N. J. Jan. 8, 1929, page 67.*

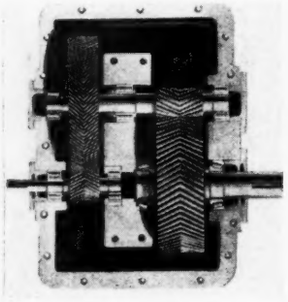
Herringbone Tooth Roller Bearing Speed Reducer

Made in capacities from 1 to 5,000 hp. this speed reducer has continuous herringbone teeth



and roller bearings which combine radial and thrust capacities on both shafts. The type illustrated is available for ratios between 2 to 1 and 10 to 1 in

ratings from 3 to 300 hp. Several types of double reduction units are also available in ratios between 10 to 1 and 60 to 1 and ratings from five to 200 hp. Rolling-mill reduction units are available in ratios between 1 to 1 and 5 to 1 and in sizes up to 5,000 hp. These units are fitted with bearings of the plain roller type or other type, as best suits the service on which the unit is to be used. The bearings are held in cast-steel sleeves which are adjustable. *The Farrel-Birmingham Company, 344 Vulcan St., Buffalo, New York, Nov. 20, page 849.*



Improved Herringbone Speed Reducers

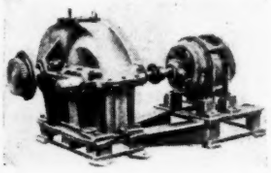
A feature of this line of continuous-tooth herringbone speed reducers is the use of anti-friction roller bearings on the high, intermediate and slow-speed pinion shaft, and tapered roller bearings on the slow-speed gear shaft. The reducers are made in both single and double types. *D. O. James Manufacturing Company, Chicago, Ill. July 10, page 73.*

Microhite Bearing Hanger

Self-alignment of the bearings permitted by freedom to move both in the horizontal and vertical planes, is a feature of this bearing hanger illustrated.

Rough adjustment of the bearing is made by sliding the shank in the base and locking it by means of setscrews. Then the final adjustment is made by means of the knurled collar which screws into the yoke. Lateral adjustment is made in the usual way by means of slotted holes in the base.

Stock sizes of this hanger range from bores of 1 in., and heights to the center line of $3\frac{1}{2}$ to $10\frac{1}{2}$ in. The range of bearing lengths is 2 to $2\frac{1}{2}$ in. Both ball and bronze bearings which are interchangeable may be obtained. *Boston Gear Works Sales Company, Norfolk Downs, Mass. Dec. 18, page 1012.*



Speed Reducers with Welded Beds

Speed reducers with welded steel motor beds have been added to this line, and any unit may now be obtained with this type or with a cast-iron bed. Several sizes have also been added. These include four single-reduction, three double-reduction, and three triple-reduction units, also nine sizes of single-reduction units with vertical centers. The speed ratios are as follows: Single-reduction units of both horizontal- and vertical-center types, up to 10 to 1; double-reduction units from 10 to 1 up to 70 to 1; and triple-reduction from 70 to 1 to 300 to 1.

Alloy steel shafts are used and the pinions are heat-treated chrome-vanadium steel forgings. The units are fitted with air plane-type sleeve bearings. *Falk Corporation, Milwaukee, Wis. Jan. 22, 1929, page 142.*

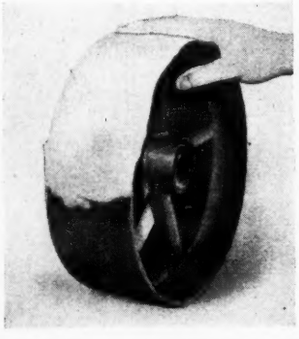
Single - Double- and Triple-Herringbone Speed Reducers

The gears have been so arranged in this double-speed reducer as to form an unusually compact unit. The high-speed gears are of the continues herringbone type and the slow-speed herringbone gears are divided in the center. The pinions are cut integral with the shaft, and the teeth are generated on the large gears after they are fitted onto their respective shafts. Ball bearings are used on the high-speed shaft and roller bearings on the intermediate and slow-speed shafts. The housing is designed for the three-point method of mounting in place of the four-point as generally used.

The reducers are designed to permit the use of a heavy body ubricant and the gears and bearings are lubricated. The line includes single reduction units, in which both shafts are mounted on tapered roller bearings. *Palmer-Bee Company, Detroit, Mich. Nov. 20, page 850.*

Pulleystone Anti-Slip Pulley-Facing Compound

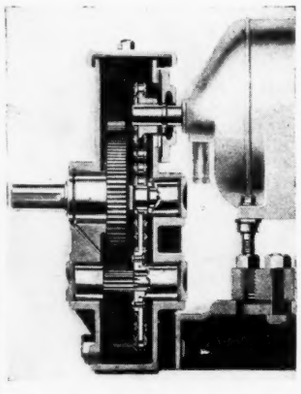
This anti-slip compound, known as "Pulleystone," is a plastic material and is applied to the pulley face in a thin coat. The surface thus produced, it is claimed, gives high adhesion, which increases the service. It



can be used with practically all types of pulleys and belting. *Chicago Belting Company, Chicago, Ill. Nov. 20, page 850.*

Small Single- and Double-Speed Reducers

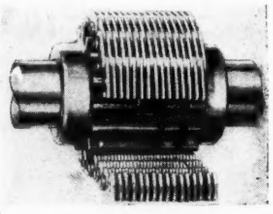
The first reduction in both the single- and double-speed types is accomplished by a standard



roller chain and sprockets. The speed can be reduced from two to six times in this step. The motor base is bolted to the reducer housing and is provided with adjustable studs so that the motor can be readily aligned with the reducer. No coupling is used between the reducer and the motor, the motor shaft extending into the reducer housing and carrying the chain sprocket. The reducers are made in sizes from one-fourth to five horsepower. *Cullman Wheel Company, 1344 Altgeld St., Chicago. Oct. 30, page 732.*

Silent-Chain Type Flexible Coupling

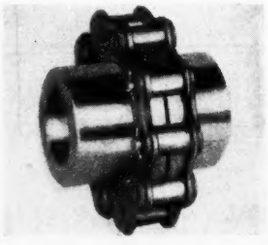
A silent chain wrapping two sprockets, each one-half the width of the chain, constitute this coupling. One sprocket has



a guide groove in the center of its face to hold the chain in place. The other has no guide grooves and is free to float under the chain, which is loose enough on the sprockets to take care of ordinary misalignment. *Morse Chain Company, Ithaca, N. Y. Nov. 13, page 810.*

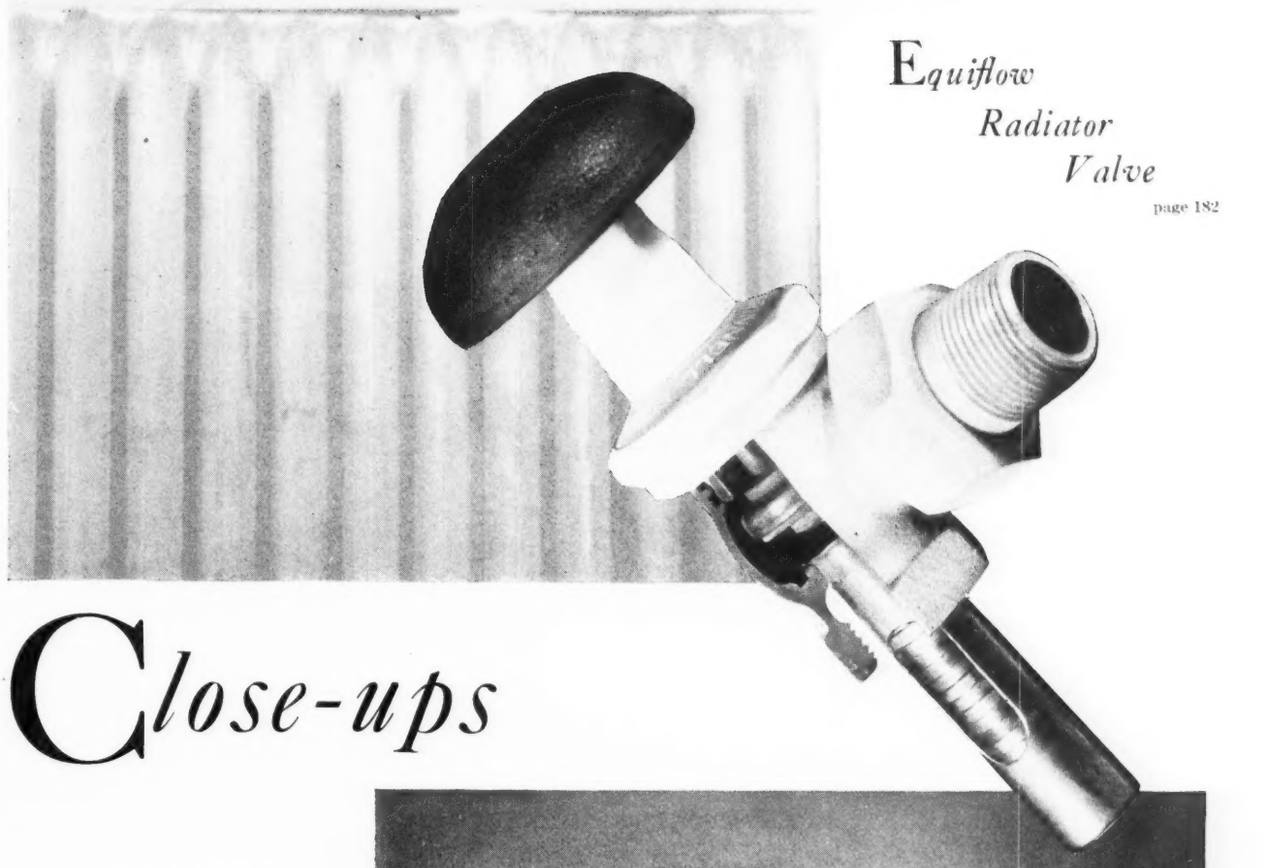
Semi-Steel Pulley

A line of semi-steel pulleys covering a wide range of sizes is now available. Among the advantages claimed for this new pulleys is that for a relative size and weight, as compared with cast iron, a closer-grained and better-looking pulley is obtained and one that is especially well suited for a sharply fluctuating load. *W. A. Jones Foundry & Machine Company, 4401 West Roosevelt Road, Chicago, Ill. Nov. 13, page 811.*



Sprocket Chain-Type Flexible Coupling

The standard type flexible coupling shown is used for constant-torque drives. It is available with either cast-iron or steel sprockets and in bores from $\frac{5}{8}$ to $8\frac{5}{8}$ in. in steel and $1\frac{1}{4}$ to $7\frac{1}{2}$ in. in cast iron. *Diamond Chain & Manufacturing Company, Indianapolis, Ind. Nov. 20, page 849.*



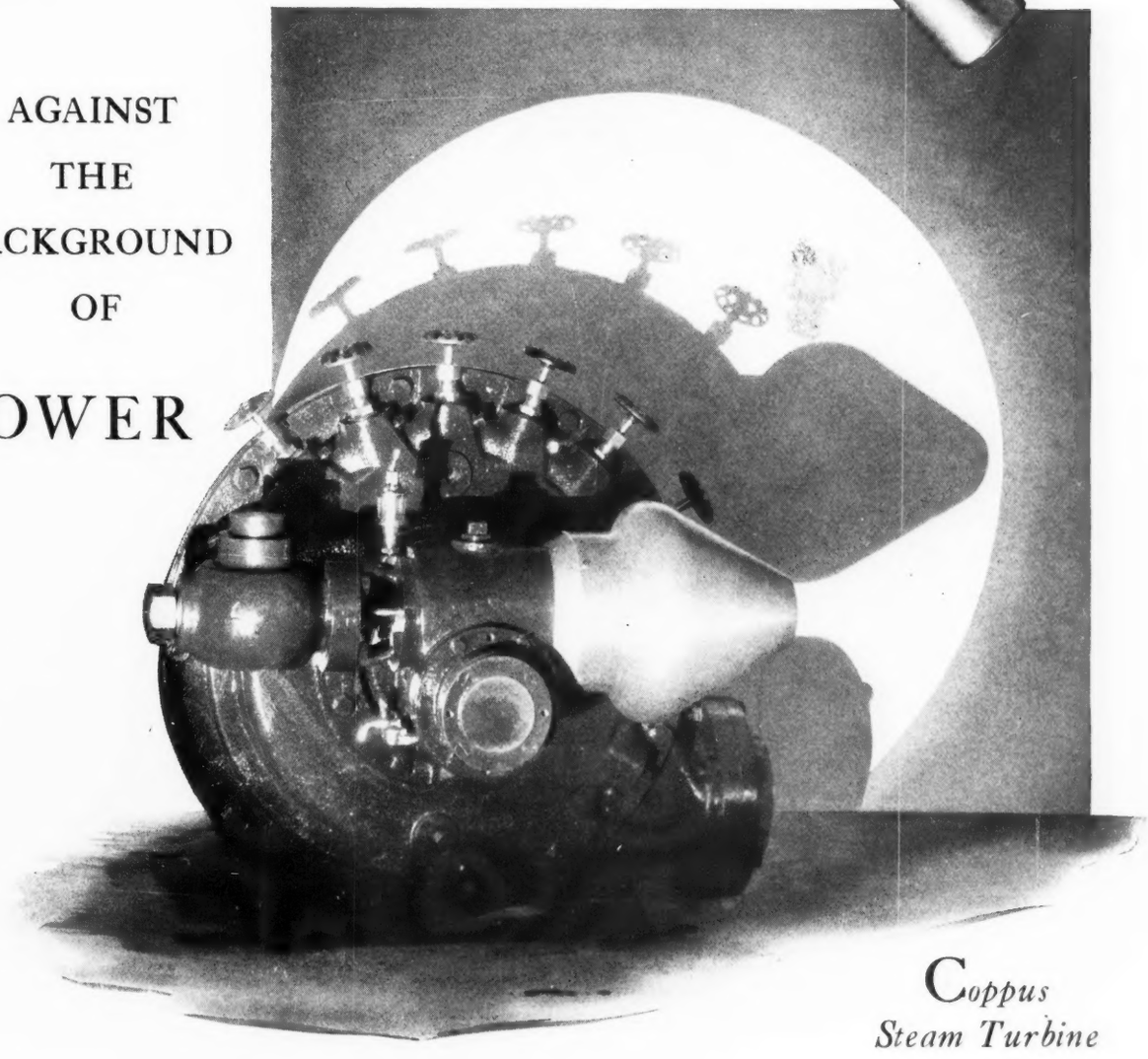
Equiflow
Radiator
Valve

page 182

Close-ups

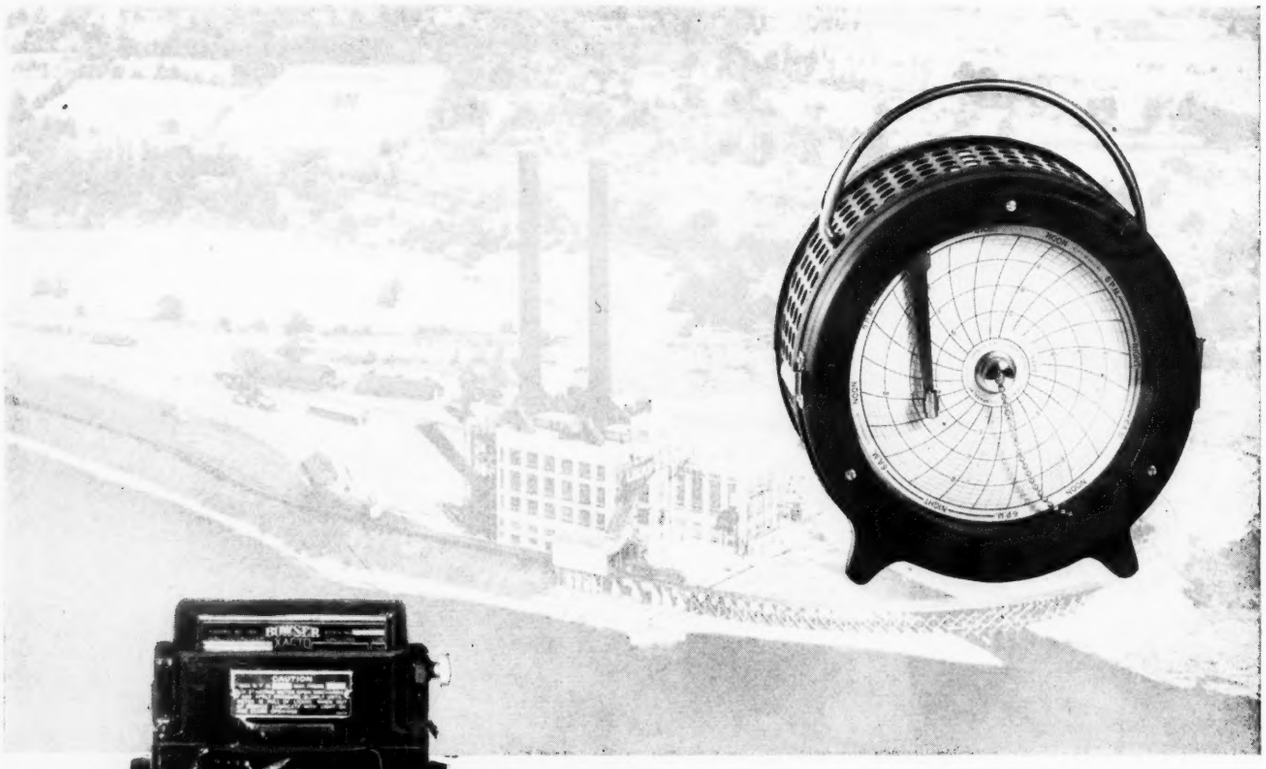
AGAINST
THE
BACKGROUND
OF

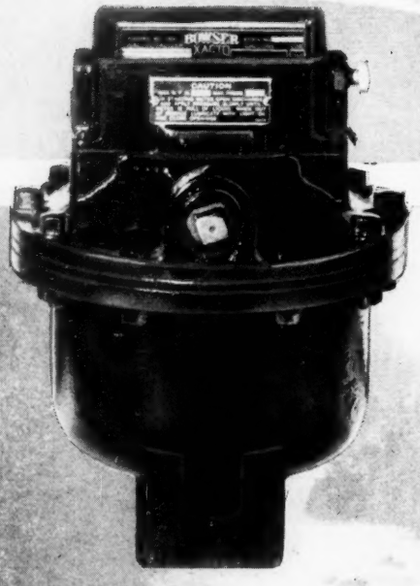
POWER

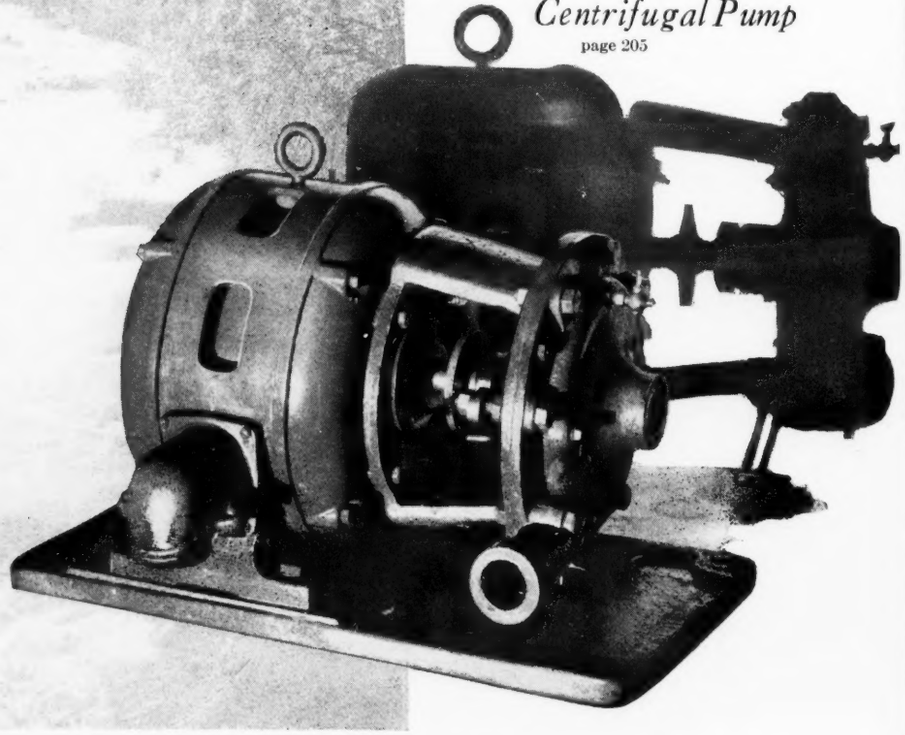


Coppus
Steam Turbine

page 191







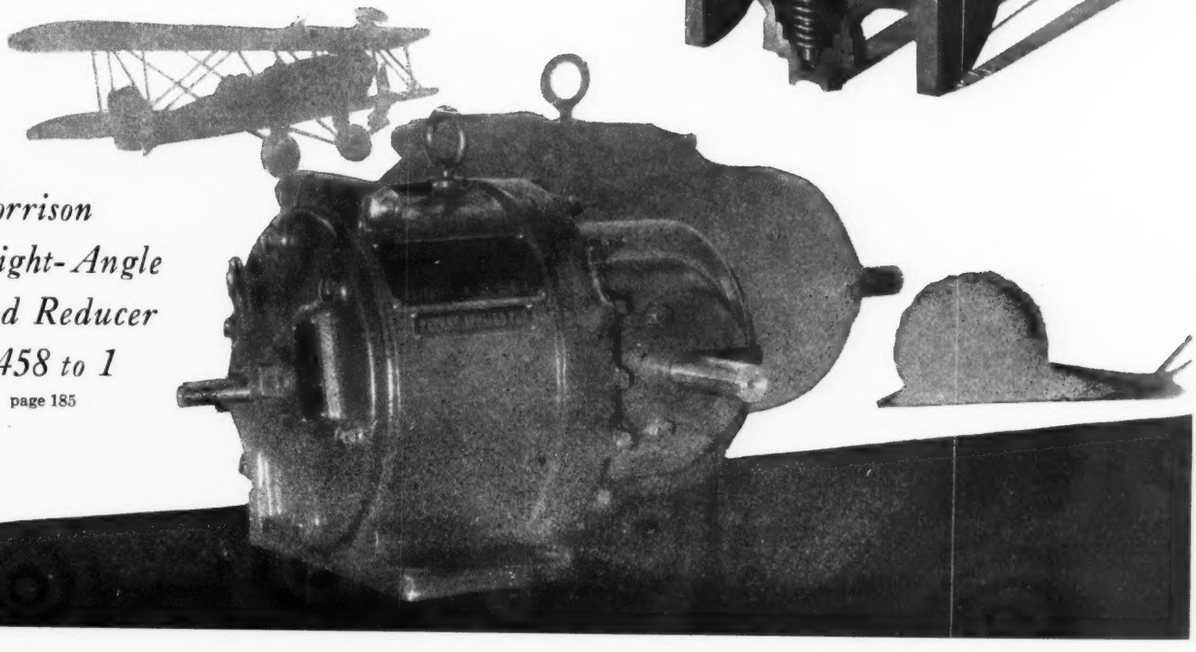
Bristol Portable Recording Thermometer
page 189

Xacto Fluid Meter
page 190

Aldrich Motor-Driven Centrifugal Pump
page 205

Tagliabue
Recorder
Controller
page 207

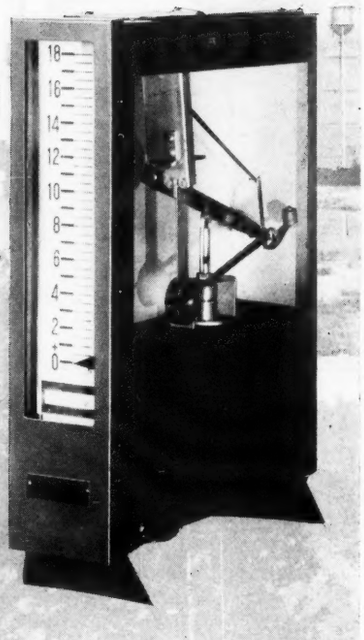
Leslie
Improved
Pump Regulator
page 207



Morrison
Right-Angle
Speed Reducer
1458 to 1
page 185

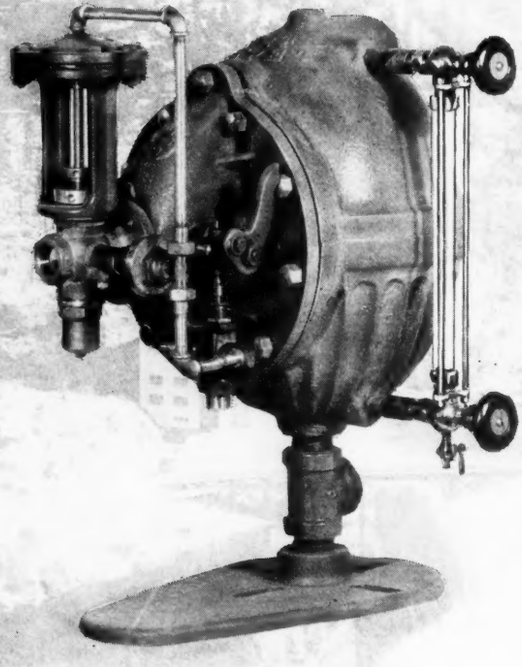
Cochrane High-Pressure Tandem Blowoff Valve

page 200



Ellison Mercury-Element Draft Gage

page 190

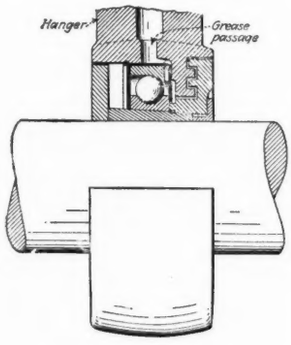


Curtis Return Trap

page 209

Dustproof Conveyor Bearing

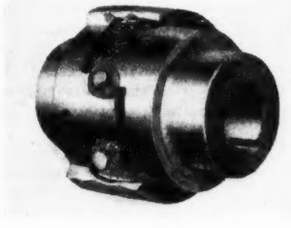
The dustproof ball bearing and hanger illustrated is designed primarily for use in spiral or screw conveyors, used in carrying dusty or abrasive materials. The bearing is fully inclosed and is protected by a



labyrinth cap which fits on the material handling end of the bearing over a threaded portion of the adaptor sleeve. The ball races are inclosed in a steel cap with a steel spring end-piece at one side, which maintains close contact with the ends of the races. Lubrication is introduced into the bearings through a pressure-type fitting and a passage drilled in the hanger. Made as an integral part of the bearing support the hanger eliminates the necessity for U-bolts and simplifies installation. The design is such that the bearing is also said to be suitable for conveying hot materials in that expansion and contraction are provided for. Complete units are being built in sizes to fit the standard conveyors now in use. *Transmission Ball Bearing Company, 1050 Military Road, Buffalo, N. Y. June 26, page 1159.*

Lovejoy Flexible Coupling

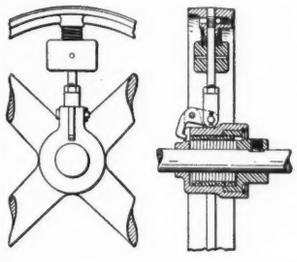
The flexible features of this coupling are accomplished by means of loosely floating resilient rollers placed between the two jaws of the coupling. The rollers are placed radially between jaws that extend from flanges parallel with the shafts.



This construction gives a rolling contact between the jaws upon relative movement caused by either misalignment or end movement of the shafts. Either solid rubber or rubber-covered metal rollers are used. The coupling can be used for rotation in either direction, half the rollers being under compression and the other half idlers. The only wearing parts, the rollers, are readily renewed by simply sliding back the outer cover. The coupling is being made in shaft sizes from $\frac{3}{4}$ to 5 inches. *Lovejoy Tool Works, 391-331 West Ohio Street, Chicago, Ill. March 27, page 570.*

Clutch Uses Spring as Friction Member

In its simplest form this clutch consists of a steel coil spring mounted inside of two adjacent and abutting cylindrical bores. When one of the cylin-



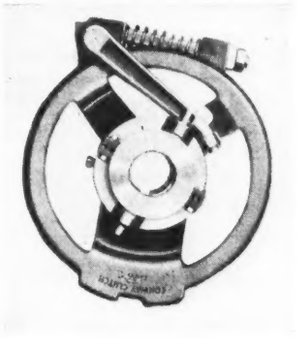
drical members revolves with respect to the other in a direction that would tend to expand the spring, friction between the spring and both cylindrical members builds up and gives clutching action. If the rotation is in the opposite direction, the tendency is to coil the spring, and friction between the spring and the rotating members becomes slight and the clutch disengages. The mechanism therefore acts as a ratchet.

One of the many applications of this clutch is illustrated. Here the device is built into a pulley to serve as a centrifugal clutch. It may be used as an unloader for pumps and air compressors. By use of the clutch an electric motor driving a piece of equipment may be permitted to attain full speed before the load is put on, thus enabling a motor smaller than would usually be required, to be used. In case of an overload the clutch automatically disengages, thus protecting the motor. *L. G. S. Manufacturing Company, Indianapolis, Ind. May 15, page 869.*

Contracting Band Clutch

A contracting band clutch, operated by a shifter yoke, slides a cone member under the roller on the end of the operating lever. The clutch is of all-steel construction and the shifter cone is made of hardened steel.

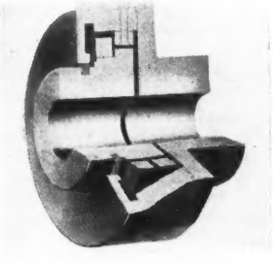
A special feature is the ease



with which the friction lining may be replaced. To do this it is not necessary to remove the clutch from the shaft, but by simply removing two screws and shoving the pulley, or other member with which the clutch is used, along the shaft a distance slightly more than the width of the friction band, the new lining is readily replaced. *Conway Clutch Company, 1956 West Sixth St., Cincinnati, Ohio. June 5, page 1029.*

Type B Flex-Ring Coupling

In this style B coupling, flexibility is furnished by means of two long ring-shaped springs



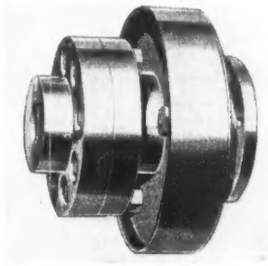
capable of a considerable degree of deflection. The hub of cast steel has two lugs which fit into gaps in the drive rings. It also is provided with a recess for felt packing that retains grease in the housing. The driving springs are of heat-treated spring steel, machined to fit over the projections on the hub and the keys in the housing. The flange and the housing of the coupling are bolted together, and all inside parts are held in position without the use of snap rings or bolts. *T. L. Smith Company, Milwaukee, Wis. Dec. 18, page 1013.*

Combination Automatic Backstop and Flexible Coupling

This combined automatic backstop and flexible coupling is designed for use on elevators, conveyors and other equipment drives where there is a possibility of reversal of travel when the equipment is standing idle or the motor is stopped by the operator in case of motor failure.

The unit consists of a drum-shaped housing on the back of which is integrally made one-half of a flexible coupling containing rubber bumpers with bronze bushings, a one-half coupling fitted with steel pins which engage the bushings, a ratchet plate and three pawls.

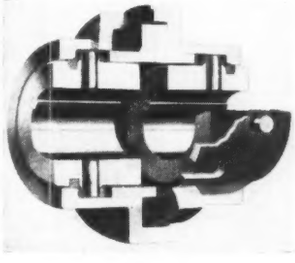
A flange which is attached to the machine housing is cast in-



tegral with the ratchet. This ratchet operates within the drum housing which, in turn is connected to the motor shaft through the flexible coupling. On the inner face of the housing are three pawls which engage the ratchet the moment the housing stops revolving. Centrifugal force keep the pawls out of engagement with the ratchet during operation, but should the shaft or motor stop, the pawls engage with the ratchet through gravity and provide a brake against reversal of travel of the machine. The backstop is available in a number of shaft sizes and horsepower capacities. *The D. O. James Manufacturing Company, Chicago, Ill., Dec. 4, page 936.*

Flex-Ring Shaft Coupling

In this Flex-Ring coupling torsional load or drive is transmitted through a ring-shaped spring which engages extensions on each of the coupling halves. The ring also serves a shock-absorbing member. A split



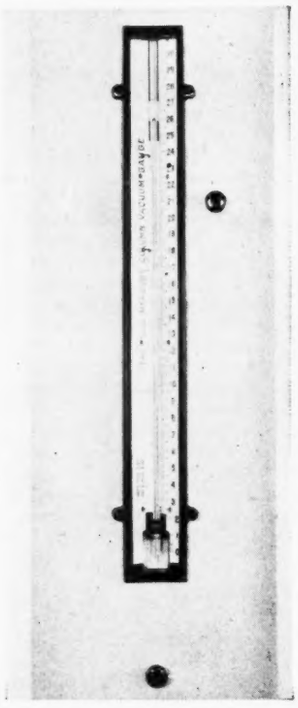
cover completely incloses the coupling and is sealed, the end being oil-tight. Provision is made in the design for considerable end play or float in the shafts as well as misalignment. *T. L. Smith Company, Milwaukee, Wis. Oct. 16, page 648.*

Meters, Recorders and Measuring Devices

In this section are described recent additions to the line of power plant, indicating and recording gages and meters.

Flush Mounted Mercury-Column Vacuum Gage

In this flush mounted mercury-column vacuum the body of the instrument is set back of the panel and a knurled knob is provided at the bottom of the instrument, by means of which the cistern can be raised or lowered to make a correct zero

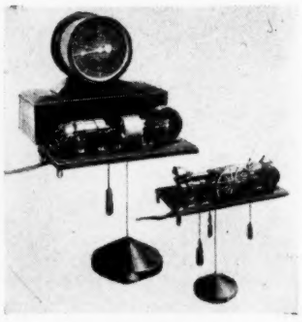


setting. A knob is also fitted at the upper right-hand side of the gage to operate the vernier, and an engraved thermometer is mounted on the scale to indicate the temperature of the mercury column. *Taylor Instrument Companies, Rochester, N. Y. Jan. 1, 1929, page 29.*

Long-Distance Water-Level Indicator

An improved type of water-level recorder and indicator which uses Selsyn motors for giving long-distance indications.

The water level is obtained by the height of the float, the position of which is transmitted to the drum. As the float rises and falls with the water level, the drum is rotated and turns the rotor of the Selsyn motor.



The motor has a stator with a three-phase winding and a rotor with a single-phase winding. These windings are connected in parallel with the windings of the motor in the distance indicator.

The transmitter, with its indicator or recorder, is at the site where the water level is to be measured, and the indicator in the power house or whatever place it is desired to have knowledge of the water level.

Either glass pens with ink reservoirs or pencils are standard. The recorder is also equipped with its own indicating dial for determining the water's height independent of the chart. *Julien P. Friez & Sons, Baltimore, Md. June 5, page 1030.*

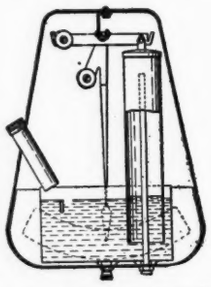
Flush-type Round Case Recorder

The thermostatic system of this recorder, which is designed especially for power-plant use, may be either vapor tension, gas filled, mercury or compensated

mercury filled. The recorder has a full-size 10-in. chart and a pen travel of 4½-in. It is also furnished with one to four pens for recording temperatures or pressures. *C. J. Tagliabue Manufacturing Company, Brooklyn, N. Y. Jan. 22, 1929, page 144.*

Single-Pointer Draft Gage

In this improved single-pointer dial-type draft gage the operating bell is unusually large, being 2¾ in. in diameter, with 2-in. travel for the low ranges, giving a displacement of 8 cu.in. The fulcrum knife



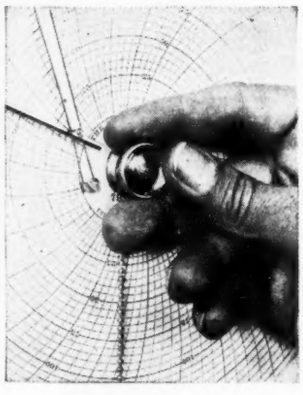
edges on the counterweighted beam *C*, on which the bell and pointer are suspended, are of steel, casehardened and honed. The pointer is of the tapered-channel type, minimizing vibration.

The liquid pan is of large area. A filler is conveniently placed in the side of the case, and the level of the liquid can be readily observed through it.

The scale is of white celluloid, 10 in. long and of good visibility, with black graduations and figures $\frac{9}{16}$ in. high. The range of the instrument is up to 5 in. minus and 6 in. plus. *Lewis M. Ellison, 214 W. Kinzie St., Chicago. May 1, page 783.*

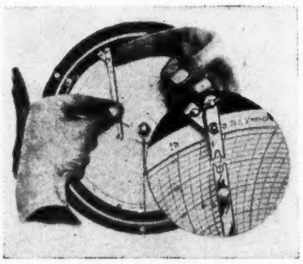
New Chart Hub for Recording Instruments

A slight push of the tension head on this push-button chart hub snaps it into position, where it grips the chart securely in place. Simply twisting the head to left or right turns the chart to the correct time adjustment, removal of the chart holder being unnecessary. The ease with which the hub can be detached is an important factor. With the holder between the first and second fingers, the operator has simply to press the button and the chart is released. *Foxboro Company, Inc., Foxboro, Mass. May 1, page 782.*



Detachable Pen Arm for Recording Instruments

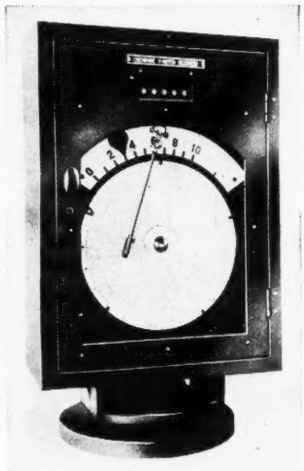
The pen arm is made with an open end, so that it can be quickly replaced if bent or broken. It is readily detached



with the finger nail and a new one slipped into place. The lower end of the pen arm is also made open to facilitate the removal, cleaning and inking of the pen and to keep the pen arm clean. *Foxboro Company, Inc., Foxboro, Mass. Oct. 16, page 650.*

Improved V-Notch Weir Recorder

A feature of this improved V-notch weir recorder is the use of a simple cam as a rectifying mechanism, to give uniform graduation on the recording chart, and indicating scale. The cam is hung from pivot



bearings and oscillates in a vertical plane, while a roller carried by the float stem and moving up and down in a straight line bears against the edge of the cam. A counterweight on the cam keeps the latter always in contact with the roller.

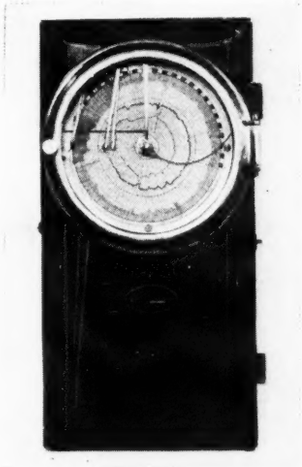
The positive, direct drive from the float to the recorder pen eliminates lost motion, and rapid up and down movements of the float cannot put the instrument out of order.

The integrator is of the clock-driven type and imposes no restraint upon the flow-measuring parts. Only one

clock is required, and this may be of the double-spring type or an electric clock may be used where alternating current of controlled frequency is available. *Cochrane Corporation, Phila., Pa., Jan. 15, 1929, page 102.*

Combined CO_2, Draft and Flue-Gas Temperature Recorder

The Orsat principle of operation, as used in former types, is retained in this new model, the changes having been made in the recording rather than in the analyzing parts. Suspended pens, a ten-inch circular chart and a new silhouette-type aluminum chart case are the essential features. The pen of the draft gage is actuated by a special slack leather diaphragm as used in Hays pointer-type draft and pressure gages.

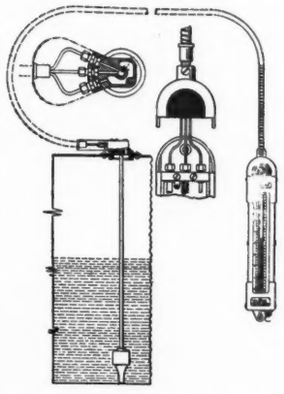


Where water conditions are bad or where a portable CO_2 recorder is desired for periodic tests on several boilers, the meter can be furnished with a motor-driven pump to recirculate water from a three-gallon tank mounted inside the supporting base of the instrument. For portable work a special three-wheel truck is furnished. *Hays Corporation, Michigan City, Ind. Dec. 18, page 1014.*

King-Seeley Telegage

This gage is an adaptation of the telegage used in the automotive industry and is designed for such uses as checking and measuring the fuel-oil supply for oil-burning equipment and Diesel engines, brine supply in refrigerating plants, reservoir and penstock levels in hydroelectric plants, and similar services.

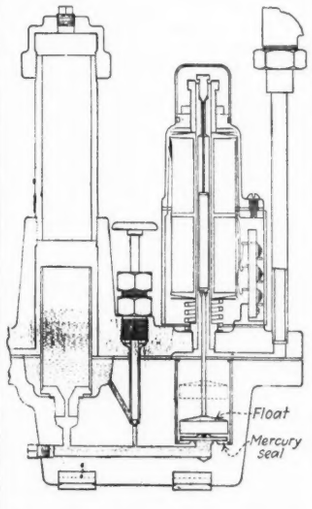
The gage operates on the simple hydrostatic principle of measuring the weight of liquid pressing down on an air bell. The air bell is placed at the bottom of the tank, and any increase or decrease in the depth of liquid changes the pressure on the air in the bell. This pressure is balanced against a heavy liquid in a direct reading U-tube gage placed at some convenient point adjacent to the tank, or a considerable distance from it as desired. The connection between the air bell in the tank and the U-tube gage is made through a small flexible copper tubing. Provision is made for preventing the liquid from being drawn out of the U-gage and also for keeping the air bell full of air.



Four models are available: *A* for measuring tanks up to 32 in. deep, *B* for tanks up to 66 in., *C* for tanks up to 11 ft., and *D* for greater depth. *King-Seeley Corporation, Ann Arbor, Mich. July 31, page 208.*

Device for Preventing Mercury Losses in Flow-Meter Manometers

The loss of mercury from the manometer of a flow meter owing to a suddent increase in flow, beyond the maximum capacity, is obviated by the special mercury blowout check illustrated.



A resilient disk is flexibily attached to the bottom of the float seats. If the downward travel of the float exceeds the value for maximum flow, it closes the passage from the high-pressure leg and prevents the upstream pressure from blowing mercury out of the downstream side. Further increase in flow simply makes the seal tighter. Normal action is resumed automatically. *Brown Instrument Company, Philadelphia, Pa. Oct. 30, page 732.*

Boiler Room Instrument Panel

This panel consists of a U-shaped plate of ¼-in. boiler plate inclosed at the top and fitted with hinged door at the rear, through which the valves, piping and wiring for the instruments is readily accessible.

If desired the panels can be furnished with a slate front instead of steel. The cases of the various instruments on the board including the draft gage, steam pressure and temperature gage and the CO_2 recorder are designed so that they may be mounted flush or semi-flush. *Hays Corporation, Michigan City, Ind. Feb. 28, page 388.*

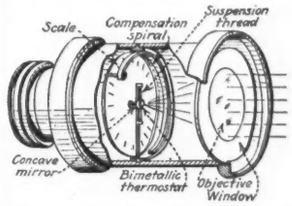
Small Atmospheric Recording Thermometer

This recording thermometer (shown on the special insert) uses four-inch charts designed to give clear readings over appropriate ranges. It is self-contained, being used without leads or other connections.

The pen arm is attached to the measuring element and records directly on the chart without the aid of any intervening multiplying devices. A special frictionless form of inverted pen arm with fountain pen is standard equipment, the pen carrying a sufficient supply of ink to give a uniform record line over the complete chart revolution of 72 hours. The clock used has all parts plated to safeguard against any possible action of moisture. *Bristol Company, Waterbury, Conn. April 3, page 615.*

Pocket Radiation Pyrometer

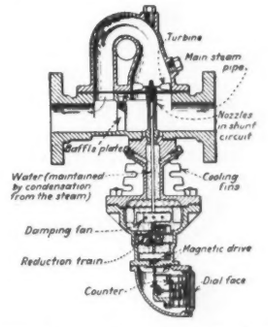
The principle on which this radiation pyrometer operates is the measurement of the radiant energy emitted by a hot body whose temperature is to be determined. The scale is transparent and can be seen at the same time the glowing surface is viewed through the ocular, enlarged about eight times. To protect the eye against the bright rays when measuring high temperatures, a red glass is provided to place between the eye and the ocular. The spiral of the instrument attains a considerable temperature even with low radiation and indicates quickly the heat intensity investigated.



The instrument has a distant factor of about twelve. All working parts are inclosed and protected in a dustproof housing. The over-all dimensions are 6 in. long and 2 in. in diameter, and the weight is approximately 6 oz. Five scale ranges are available from 1,100 to 2,600 deg. F., to 1,100 to 4,000 deg. F., and from 600 to 1,400 deg. C. to 600 to 2,200 deg. C. *Colonial Supply Company, 217 Water St., Pittsburgh, Pa. Nov. 13, page 809.*

Shunt Steam Meter

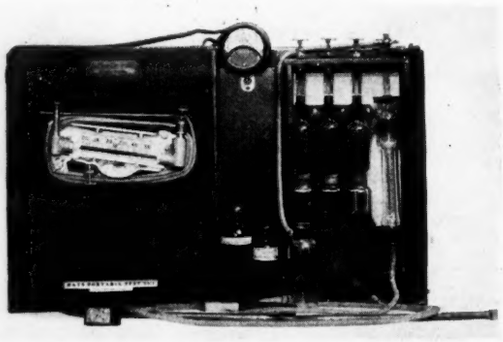
The meter Type KS is a complete unit in itself and is designed to be placed directly in the pipe line. As steam enters the meter, a portion of it is deflected upward through nozzles and rotates a small turbine mounted on the vertical shaft. This eliminates moving parts from the main line of flow. Near the lower end of this shaft is mounted the damping fan which revolves in a chamber filled with water formed by condensation, keeping the turbine speed low. The counter train at the lower part of the meter is driven by the turbine shaft through a permanent mag-



net, thus preventing the possibility of leakage of water into the counter chamber and avoiding stuffing-box friction. The counter dial can be arranged to face in any desired direction. The meter is made in 2-, 3- and 4-in. sizes and for pressures from 3 to 225 lb. gage. *Builders Iron Foundry, Providence, R. I. Feb. 7, page 266.*

Portable Test Set

This test set consists of a flue-gas analyzer, flue-gas thermo-gage and draft gage, compactly arranged in an oak carrying case weighing less than 20 lb. The analyzer is the standard Hays machine, either



single-chamber style for carbon-dioxide only or of the three-chamber type for carbon-dioxide, oxygen and carbon-monoxide.

Mounted on the inside of the door is an inclined-tube draft gage with a micrometer screw for leveling. A needle valve is provided to lock the oil in the oil well while the set is being transported. The scale has a range of ½-in. water column, but an auxiliary spirit level can be added to increase the range to one inch.

The thermo-gage is a small portable indicating pyrometer with lead wire and special alloy thermocouple. For the measurement of flue-gas temperature a range of 75 to 1,200 deg. F. is provided. A 75- to 2,500-deg. F. range can be supplied for higher temperatures. As an alternative for the thermo-gage a metal armored thermometer, with a range from 100 to 950 deg. F., can be supplied. *Hays Corporation, Michigan City, Ind. Apr. 10, page 656.*

Wide-Range Mercury-Element Draft Gage

This line of vertical-pointer draft gages comprising a number of models having ranges from 10 to 50 in., has been designed to meet the demands imposed by the larger generating units now being used.

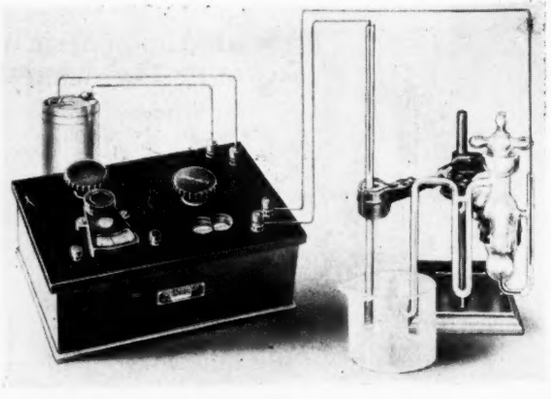
The unusually wide range has been made possible with practically the same size of instrument as used for the lower ranges by the employment of a mercury element in place of the water element generally used. For illustration of this gage see pictorial insert.

This instrument (illustrated on the insert) is of unusually substantial construction, with the complete movement suspended on hardened steel edges, and so designed and counterbalanced that the pointer moves in a vertical straight line, and the graduations are equal at all points of the scale.

The operating mechanism is a one-inch diameter steel bell floating in a 1¾-in. well filled with mercury. Oil is used on the top of the mercury to minimize the adhesion. The gages are arranged for flush mounting and for grouping on a panel. *The Ellison Draft Gage Company, 214 West Kenzie St. Jan. 22, 1929, page 145.*

Electrical Indicator for Hydrogen Ion Determinations

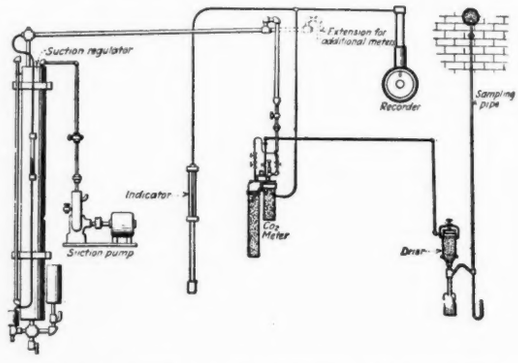
This electric pH indicator is designed for process control in tanneries, textile and other industries. It is specially designed for the quinhydrone electrode, and when using it the electrode connections never have to be reversed. The range of the instrument is 1 to 9 pH, and practically all common solutions whose pH value is in this range can be measured. It measures electrically by what is known as the "Null" potentiometer methods. *Leeds & Northrup Company, 4901 Stenton Ave., Philadelphia. Pa. Nov. 20, page 850.*



Electrically Operated Apex CO_2 Recorder

Included in the improvements recently made to this recorder is the use of a motor-driven vacuum pump to operate the instrument in place of the steam aspirator formerly used. The suction of the vacuum pump which draws the gas through the meter is maintained constant by a suction regulator which consists of a closed vessel filled with oil, the space above which is connected with the pump and to the outlet of the meter.

A pipe open to the atmosphere extends into the oil in the regulator near the bottom, and the air bubbling up from it automatically prevents the suction from increasing beyond the point for which the regulator is designed. In this recorder the flue gas flows through the meter continuously, developing a changing pneumatic pressure within it, the magnitude of the changes depending on the percentage of CO_2 present in the gas. The CO_2 is absorbed in a dry cartridge placed in the meter. The instrument employs the pyroporous filter which is placed on the end of the sampling line within the furnace. *The Uehling Instrument Company, Paterson, N. J. Jan. 24, 1928, page 160.*



Liquid Meter Measures by Actual Displacement

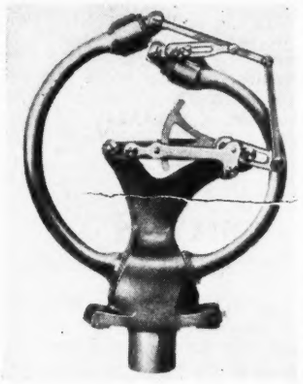
This meter, known as the Xacto and illustrated on the insert, contains five cylinders, each fitted with a piston, the lower ends of which are fixed to a wobble plate. As the liquid flows into some of the cylinders, that in the others is being discharged through a rotary valve, the pressure causing the wobble plate to operate, which in turn operates the recording mechanism mounted on the top.

The meter is made in five sizes. No. 1 has a capacity of 10 gal. per min. and is designed to operate against a head pressure of 125 lb. The other sizes are: No. 2, 20 gal., 50 lb.; No. 3, 40 gal., 50 lb.; No. 4, 80 gal., 50 lb.; and No. 5, 200 gal., 50 lb. The meter is fitted with an angular face dial arranged for easy reading. The meters are equipped with continuous counters, the No. 1 recording to 100,000 gal. and the No. 5 to 1,000,000 gallons.

The body of the meter is of cast iron. A pipe line strainer and air release, for use with the meter, are also available, the air release being necessary where a pump is used to handle the liquids. *S. F. Bowser & Company, Fort Wayne, Ind. Sept. 18, page 495.*

Flush-Type Cases for Continuous Chart Recorders

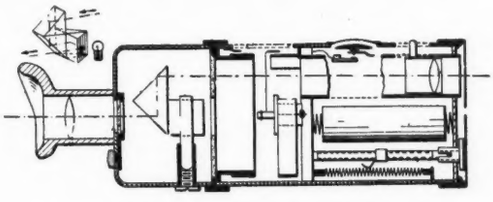
Continuous strip-chart recording pyrometers, CO_2 meters, tachometers and resistance thermometers can now be furnished in flush-type cases with or without panels as specified. All these instruments can be supplied in a single, duplex, multiple or multiple duplex models 12 records on one chart. An important feature of these new flush-type recorders is an arrangement by which the recording mechanism can be drawn out of the case at the front for easy inspection. *The Brown Instrument Company, Philadelphia, Pa. May 8, page 823.*



Screwed-End-Tube Pressure Gage

A double-tube pressure gage for high pressures and temperatures in which the connections at the tube ends are screwed instead of being soldered or brazed, as is the usual practice.

The tubes are made of a special bronze and are machine turned, not drawn, then formed to the required shape. The complete moving mechanism is independent of the case, it being supported from a connection casting which is fastened to the case only at the bottom. The gages are being made in sizes from 6- to 16-in. and for pressures from 100 to 1,000 lb. *Crosby Steam Gage & Valve Company, Boston. June 12, page 1070.*



Optical Pyrometer

This self-contained pyrometer is used like a telescope. It magnifies the object four times and the object itself appears in its actual color. The light rays to be measured are concentrated and thrown on the surface of prisms on one of which there is a small transparent test mark that appears to the eye as a clear elliptical ring. This ring is lighted by a small electric lamp. This ring represents the standard brightness by which the light of the observed body is compared.

In using the instrument it is sighted in such a way that the test mark covers the object to be measured and the brightness of the range of vision is adjusted till the test mark disappears. A master lamp is supplied with the instrument to check the brightness of the service lamp. The normal range of the instrument is 2,000 to 3,200 deg. F. *Pyrometer Instrument Company, 74 Reade St., New York City. Jan. 17, 1928, page 120.*

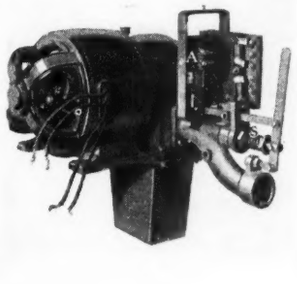
Miscellaneous Machines and Tools

Hydro-Electric Emergency Lighting Unit

A lighting unit for emergency lamps in hotels, schools, theaters and other public buildings. The unit consists of a direct-current generator having a waterwheel runner carried on its extended shaft, the whole being mounted on a baseplate forming a compact self-contained unit. It is designed to operate from the building water system.

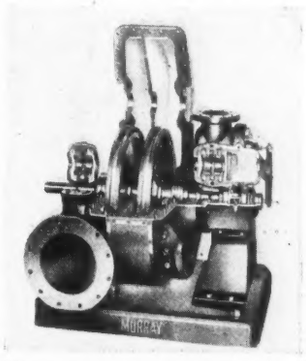
An automatic starting feature consists of a needle nozzle which is manually closed against a spring and held in that position by a latch. A solenoid which is connected across the line of the outside source of power, is arranged so that when it is de-energized, owing to failure of outside current, the solenoid core will drop and release the nozzle. An automatic switch for transferring the lighting circuit from the outside supply to the local direct-current generator is mechanically connected to the nozzle mechanism so that the nozzle and the switch operate in synchronism.

The generator is a special compound-wound type and gives approximately constant voltage from no load to full load. The waterwheel is of the conventional impulse type. *Utilities Service, Inc., Troy, Pa. April 10, page 657.*



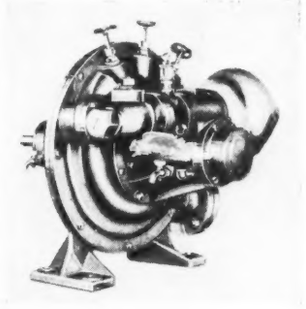
New Frame Sizes of the Murray Turbine

The particular turbine shown, which is designated as frame E, is designed for capacities up to 800 hp. at 3,600 r.p.m. and for high pressures and superheats.



The frame is nozzled for 200 hp., but owing to the needle valve construction of the nozzle, additional valves may be added to give an appreciable increased output.

The machine shown is a two-stage impulse unit having two 2-row velocity stages. For control, the turbine is equipped with constant speed and emergency governors operating independently on independent valves. The bearings are made of Sumet metal, and the nozzles, blading and governor valves and valve seats are Monel metal. Other frames sizes of this turbine are available. *Murray Iron Works Company, Burlington, Iowa. May 29, page 993.*



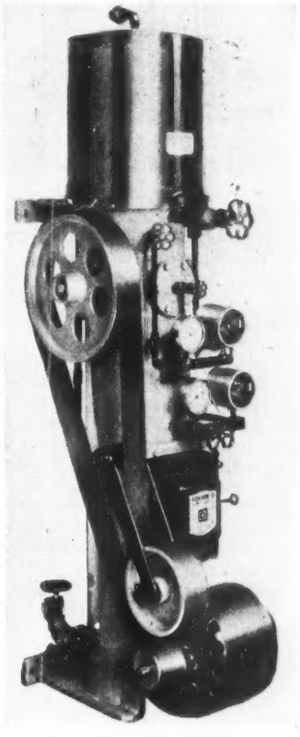
Type TF Steam Turbine With Inclosed Governor

The type TF steam turbine (illustrated on insert) is being made in three sizes, 12-, 16- and 20-in. with live steam connections 1-, 1½- and 2-in. respectively. The turbine wheel is cast of solid bronze and is carried on a shaft of large diameter and of comparatively short length. The wheel is of the two-row velocity-stage impulse type with stationary reversing sector between the two rows of buckets.

The governor is of the centrifugal type driven by a worm gear from the turbine shaft and is fully inclosed by an aluminum guard. Provision is made for changing the speed while the machine is in operation. When desired the turbines can also be equipped with an excess-speed safety trip. *The Coppus Engineering Corporation, Worcester, Mass. Oct. 23, page 691.*

A Welded Ice Machine

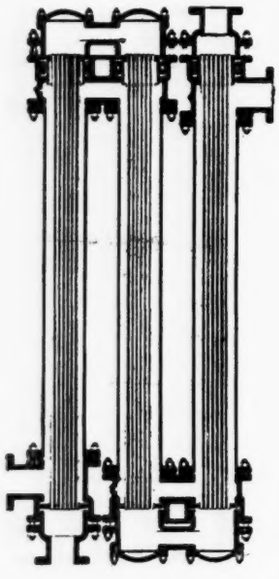
The mechanical advantages resulting from the use of welded construction in this machine are reductions in size and weight. The weight of the machine is less than half that of the usual cast-iron machine, and it occupies only 40 per cent of the floor space required by other ammonia machines.



With the exception of the compressor pistons and the flywheel, the entire machine is made of steel. The connecting rods and crankshaft are steel forgings, the rest of the parts being made from stock steel shapes. Sections of drawn seamless tubing are arc-welded together to form the removable cylinders of the compressor, and the cylinder head is composed of two pieces of steel plate arc-welded together. *Mansfield Ice Machine Company, Mansfield, Ohio. Oct. 30, page 730.*

Multi-Pass Heat Exchanger

This multi-pass, heat exchanger is made in shell diameters from 8 to 24 in. and in tube lengths 6 to 20 ft. It can be furnished in steel, cast iron or various alloys, with tubes of steel, brass, copper or alloy.



The standard construction permits of a working pressure of 125 lb. for both shell and heads, but can be supplied for pressures up to 500 lb. or greater in the shell, and 150 lb. in the head.

The exchanger is especially adapted for heat exchange between two fluids where a small end-temperature difference is required. Any number of units may be connected together to give the desired temperature characteristics. The sections can be arranged with valves and bypasses to cut out any part for cleaning or repairs. *Struthers-Wells Company, Warren, Pa. July 24, page 163.*

Bent-Tube Heat Exchanger

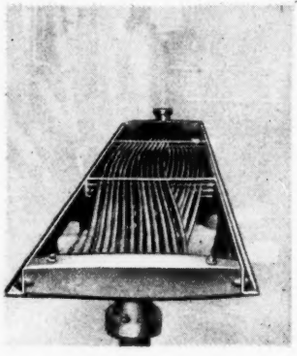
The curved-tube principle which facilitates the removal of the scale from the tubes by cracking is embodied in this heat exchanger. A series of Admiralty metal tubes are set with an initial curvature into cast-iron headers at each end, the headers being permanently spaced by angle-iron sections at each side.

The liquid or gas to be cooled or vapor to be condensed, passes through the tubes and the cooling effect is obtained either by pouring water over the tubes, from distributing spray nozzles or a cooling tower set above them, or by submerging the entire unit in a tank of water.

Changes in curvature of the tube is accomplished either by stopping the flow of cooling water, while the hot liquid continues to pass through the tube, or by stopping the flow of the hot fluid while the cooling effect is continued.

The scaling feature is advantageous in applications where the cooling-water supply is of poor quality. The exchanger may be used for cooling oil, gas, jacket water and industrial liquors or for condensing steam or vapors of various oils and chemicals.

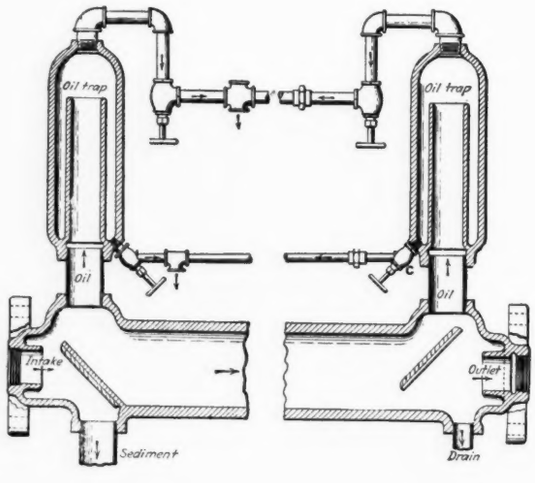
The units are made interchangeable and by simply in-



stalling additional sections, may be arranged in parallel to permit increase in capacity or stacked in series to give greater cooling effect. *Griscom-Russell Company, 285 Madison Ave., New York City. May 29, page 994.*

Bailey Feed-Water Filter

The use of baffles to change the direction of flow and comparatively large settling chambers are the principal features



of the feed-water filter illustrated. Located between the pump and the boiler, it is placed on the boiler side of the heater if the latter is of the open type, and on the pump side of a closed heater. Provision is made for surface blowoff on the settling chambers as well as blow down on them and the horizontal filter chamber. *The Baker Valve Company, 1847 East 28th St., Minneapolis, Nov. 6, page 772.*

Heat Exchanger for Corrosive Liquids

A type of heat exchanger developed especially for handling dirty or corrosive liquids. It is known as the G-R Tubeflo and is made entirely of semi-steel. The fluid passages are straight, smooth, cored holes. The main portion of a section unit consists of a number of body pieces bolted together to make up the required length for a desired cooling effect. At one end of the section is bolted a stationary head which contains the inlet and outlet connections, together with the necessary partitions for directing the flow of the fluids through the four chambers of the body pieces.

At the opposite end of the section a floating bonnet forms a crossover connection between the passages. The stationary head is also provided with a removable cover which permits easy inspection of the chambers and accessibility for cleaning.

The sections can be installed in stacks one over another; and any number of stacks can be used in parallel, depending upon the duty which they are to handle. When the sections are arranged in stacks the stationary heads of the sections are bolted together, and the body pieces of each section are held in proper position by lugs which permit free movement for expansion and contraction. *Griscom-Russell Company, 285 Madison Ave., New York City. March 20, page 527.*

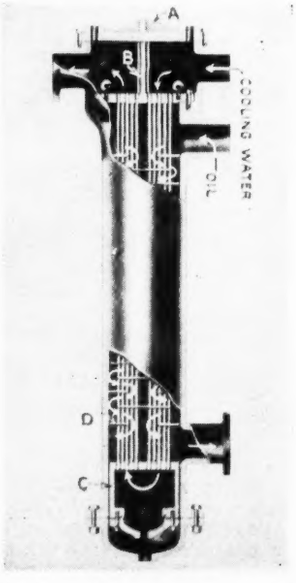
Oil Cooler with Integral Connections

In this oil cooler the shell, channel box and all connections are cast integral and the lines leading to or from the unit, either in the oil or cooling water, need not be disturbed to allow removal of the nest of tubes.

The baffle arrangement and flow provide a unit in which

counterflow is combined with crossflow. The oil flows through the shell, directed in its path by baffles, while the cooling water flows through the tubes, making two passages across the length of the shell.

Provision is made in the design to permit the tubes to be



tested readily for tightness in the tube sheet with the heads removed. The face of the floating chamber and the shell are made flush and a test flange is furnished by means of which the oil section is made tight and the tube ends can be observed through the center, while the test is applied. The shells and chambers are made of cast iron or steel, the tubes are $\frac{5}{8}$-in. O.D. Admiralty metal or steel, and the baffles and tube sheets bronze or steel. The tubes are

rolled and expanded into solid metal tube sheets. The coolers may be used for temperatures up to 1,200 degrees. *O. E. Frank Heater & Engineering Company, Inc., Buffalo, N. Y. Jan. 1, 1929, page 29.*

Improved Hand Tachometer With Rotating Gear Shift

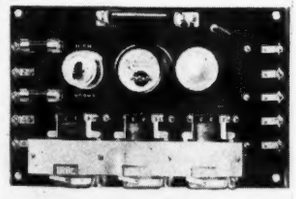
In this improved tachometer, the over-all length of the instrument has been reduced and a rotating gear shift has been

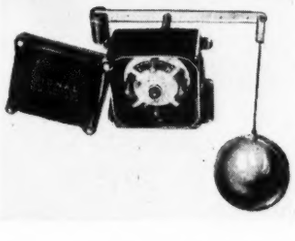
substituted for the sliding gear shift formerly used. The instrument, which is of the single-spindle, triple, quadruple and quintuple selective range type is suitable for speeds from 20 to 40,000 r.p.m. The shifting of the gears to obtain the proper speed ratio is done by turning the tachometer barrel until the desired range lettered on the barrel is in line with the dial center, where it automatically locks into position.

The tachometer is furnished with a carrying case, as illustrated, and the necessary centers or attachments to handle almost any type of shaft and for cutting or belt speeds. The weight is 12 ounces. *O. Zernickow Company, 15 Park Row, New York. Jan. 15, 1929, page 105.*

High- and Low-Water Alarm

A high- and low-water tank alarm system designed to indicate the water-level limits in an elevated water-supply tank. A single copper float ball operates

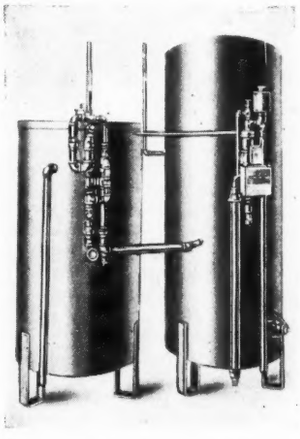




a three-wire high-low level tank switch. A control panel inclosed in a steel cabinet with a glass door carries a milliammeter, red lamp, transfer switch, test plugs, wire terminals and three relays. Each of the relays has a properly worded target which appears only when the relay is operated. *Signal Engineering & Manufacturing Company, New York. Oct. 16, page 650.*

Automatic Regenerative Water Softener

Automatic regeneration of the zeolite by simply pressing a push button is a feature of this softener. The regeneration is controlled by the electric conductivity of the brine solution through the softener. Upon the pressing of a push button a salt solution is started on its course through the softener, and after a given charge has been introduced, the electrical conductivity of the brine passing



is used as a means to shut off the charge.

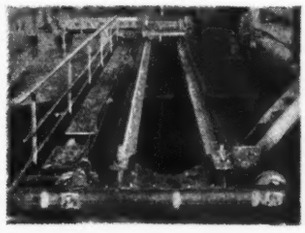
Valves that control the flow of water through the softener are operated by water passing around a piston rather than pressure acting on the back of it. Regeneration can be effected automatically or by hand control of two pilot valves, in the event of the electric current being shut off.

The softener, salting and flushing out of the brine solution are all done in an upward direction, with practically no loss in head pressure. *Water Softener Company, 3421 Bigelow Boulevard, Pittsburgh. Sept. 4, page 420.*

Arc-Welded Traveling Crane

A design of overhead traveling crane in which the bridge girders, end trucks and trolley are constructed by arc welding. The one illustrated is a 5-ton, 38-ft. 9¼-in. span crane of the I-beam girder type. Each girder is reinforced throughout its entire length by angles arc welded to the standard I-beam sections.

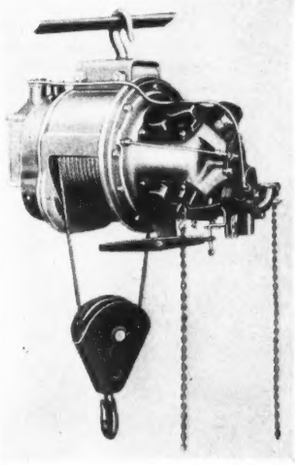
The end trucks are built up of two standard channel sections joined by welding. Each trolley frame is made of a standard channel with welded braces under each bearing



point. The welded construction tends to give greater rigidity and strength with more efficient distribution of weight, thus making it possible to lighten certain moving parts and therby obtain greater acceleration. *Cleveland Crane & Engineering Company, Wickliffe, Ohio. Aug. 7, page 248.*

Improved Pneumatic Air Hoist

A line of improved air hoists in three sizes, having capacities of 2,000, 3,000 and 4,000 lb. respectively, and with an inclosed-type load block and simple control. The motor is four-cylinder, single-acting and a balance-type control valve gives smooth and positive action to the hoist. The lifting speed has been considerably increased over former models. The one-ton size will lift 2,000 lb. at a



speed of 40 ft. per min. *Chicago Pneumatic Tool Company, 6 East 44th Street, New York. Aug. 21, page 331.*

"Hi-Lift" Trolley Hoist

The hoist is equipped with an I-beam trolley and is provided with two brakes—a motor check brake attached to the end of the hoist motor armature shaft, and a mechanical load brake in the hoisting gear train.

Another feature is the one-piece unit frame casting. A flexible coupling is used for the hoist motors and compensates for any slight misalignment between the motor and the hoist drive. The load hook can be pulled up to within 14 in. of the beam, and two stops are provided—one to prevent the load

hook from going up too high, and the other to prevent completely unwinding the rope and starting it on the wrong side of the drum. *Northern Engineering Works, Detroit, Mich. June 5, page 1030.*

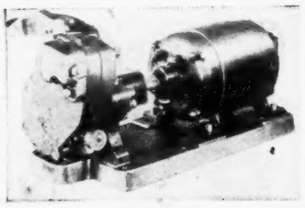
Improved Carbide Light

This carbide light or generator is designed to operate with either lump carbide or carbic cakes. The dual fuel principle

is incorporated in single lights of 8,000 and 12,000 cp. and in the duplex light of 16,000 cp. Some of the important features of the former types have been retained on this model. It cannot be overcharged, can be recharged without changing the water, and has an automatic cleaner for cleaning the burner. *Alexander Milburn Company, Baltimore, Md. Nov. 13, page 810.*

Model A-10 Unishear

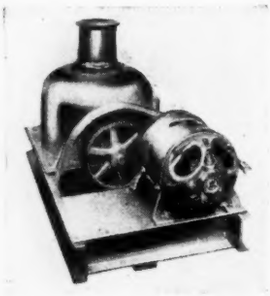
Any line, whether straight, curved or irregular, can be followed through No. 10 gage sheet metal with this model A-10 Unishear. It will also handle notches and angles. The model



illustrated is driven by a ¾-hp. motor running at 3,450 r.p.m. Motors to suit any voltage or frequency can be furnished and a sheet stabilizer to be used with the machine is also available. *Unishear Company, New York. Sept. 11, page 455.*

Vertical Capstan-Type Car Spotter

This vertical capstan-type car spotter known as 17J. Jr., is mounted on a rigid steel base made of riveted channel iron, and the motor bracket is mounted on a steel plate riveted



to channels. The capstan exerts a pull of 2,000 lb. on the rope and is designed to move a car at the rate of 30 ft. per min. *Stephens-Adamson Manufacturing Company, Aurora, Ill. Dec. 18, page 1013.*

Duct Elbow that Reduces Pressure Loss

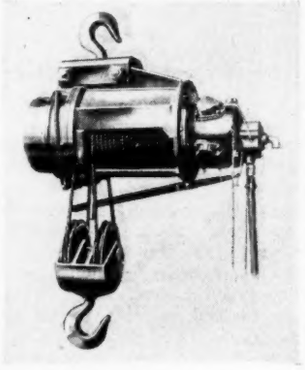
The design of this square-cornered duct elbow in which a number of short curved guide

vanes are fitted along the diagonal, is based on results of research which showed the superior efficiency of this design as compared with the conventional round elbow.

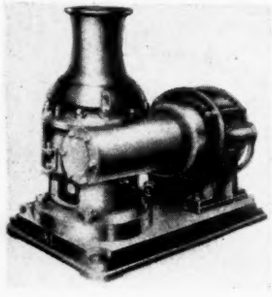
The blades are bent to 90 deg. on about a 12-in. circle and arranged on the diagonal as shown. These blades tend to reduce materially the pressure loss at the bend, give minimum turbulence and flow area reduction, and as the area is small compared to duct dimensions, surface friction is but slightly increased. *Connery Company, Philadelphia. Jan. 22, 1929, page 145.*

Ten-Ton Air-Motor Hoist

The size G air-motor hoist shown has a capacity of ten tons. It employs a four-cylinder air motor geared to a rope drum. The maximum lift is 16 ft., and



the hoist cable is $\frac{5}{16}$ in. in diameter and 83 ft. in length. Air is conducted to the motor through a ¾-in. pipe connection. Complete control of the hoist hook movement is obtained by a graduated throttle. An automatic brake is used. *Ingersoll-Rand Company, 11 Broadway, New York. Sept. 25, page 533.*



"IXL" Motor-Driven Car Spotter

The IXL motor-driven car spotter is made in two sizes having a rope pull of 3,000 and 6,000 lb. and requiring a motor of 5 and 10 hp. The reduction unit used is the standard Foote vertical worm-gear reducer, and the motor is connected to the worm shaft through an inclosed spur-gear drive. Ball and roller bearings take care of radial and thrust loads. The units are available with or without motor, as desired. *Foote Bros., Gear & Machine Company, Chicago, Nov. 13, page 811.*

Hand Extinguisher Operates With Air Pressure

This carbon tetrachloride fire extinguisher consists of two seamless cylindrical brass tanks, one for compressed air and the other for the chemical. A pump

is located between the cylinders to replenish the air pressure, or the cylinder may be filled from a compressed-air line. The extinguisher is equipped with a gage that shows the air pressure at all times, and a glass window near the top of the chemical chamber shows whether the extinguisher contains a full gallon of chemical.

The unit is discharged by pulling up the operating lever which releases the air pressure into the chemical cylinder and also opens the outlet. The extinguisher is especially adapted for use around electrical equipment, on oil fires, and in unheated buildings. *Foamite Childs Corporation, Utica, N. Y. May 22, page 922.*

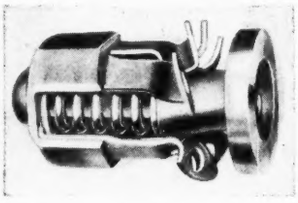
Floodlight Attachment for Acetylene Tanks

An improved floodlight attachment for use with small tanks of acetylene. The attachment is of simple and compact construction and universal adjustment is obtained with only one swing joint. The reflector is 10 in. in diameter and a type of burner is used which will not "carbon up" and requires no adjustment. *Prest-O-Lite Company, Inc., 30 East 42nd St., New York. Sept. 25, page 534.*

Conco "4" Condenser Tube Cleaner

This improved cleaner has a hexagon cap in which are inserted scrapers or blades, a cleaner head, compression spring and assembly pin which is riveted fast in the cap.

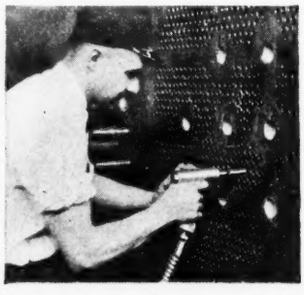
The head is made a sliding fit on the pin, and the inner end of the head is made cone-shaped, which serves to expand the



blade out against the tubes. The head is about $\frac{1}{32}$ in. smaller in diameter than the tubes it is to work in. This allows water to leak past the cleaner and to wash the dirt away as the scrapers cut it free. Water at 100 to 150 lb. pressure is recommended. The cleaners are made for ¾-, ⅞- and 1-in. tubes. *Condenser Cleaners Manufacturing Company, 422 First Ave., Pittsburgh. Sept. 4, page 419.*

"Jiffy" Gun for Cleaning Condenser Tubes

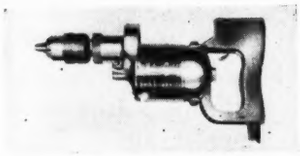
A compact, light-weight gun designed especially for shooting rubber plugs through condenser tubes. The nozzle of the gun is attached directly to a piston which functions as a valve. When the nozzle is pressed against the end of a tube, the



piston slides back, allowing water to flow through ports into the piston, hence through the nozzle into the tube. The operation of the gun is entirely automatic, no valves or cocks being used. It can be operated either by compressed air or water at a pressure as low as 50 lb. *Liberty Manufacturing Company, Jeannette, Pa. Oct. 23, page 691.*

Light-Weight Portable Drill

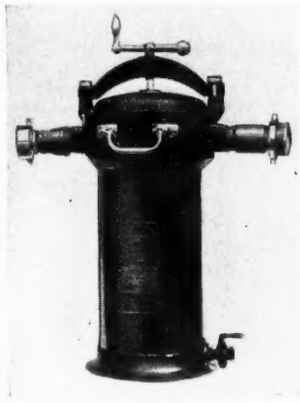
This light-weight portable drill will take drills ⅜-in. and smaller weighs approximately 7½ lb. and is powered by a universal motor controlled by a trigger switch in the handle. A



drill stand, so designed that the drill may be held vertically for drilling or horizontally for grinding, can be furnished. *Wodack Electric Tool Corp., 4627 West Huron St., Chicago, Dec. 25, page 1053.*

Phomene Accumulators for Fire Fighting

Made in stationary and portable types, these accumulators are designed to provide automatic fire protection. The accumulator is charged with a dry powder that produces a thick foam when mixed with water. An automatic valve of special design is used in connection with the accumulator and serves the double purpose of turning water on as soon as a fire starts and turning it off again as soon as the foam discharge has been completed. If desired, an electrical thermostat control may be used in place of the standard sprinkler heads located at the hazard. Under a water pressure

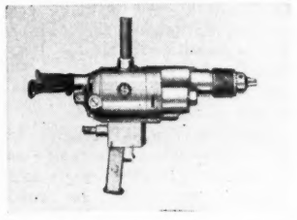


of 50 to 60 lb. per sq.in. the stationary model will discharge around 2,400 gal. of foam in about 2½ minutes.

The portable model shown is designed to give 280 gal. of foam and the discharge time is from 1½ to 1¾ min. This model requires a water pressure of 30 lb. or over for proper operation. If desired it can be supplied for automatic or semi-automatic operation. *Pyrene Manufacturing Company, 560 Belmont Ave., Newark, N. J. Sept. 11, page 456.*

Light-Weight Heavy-Duty Electric Drill

The light-weight, heavy-duty electric drill illustrated is designed for a load speed of 350 r.p.m. with a ¾-in. drill. It has a one-piece aluminum body frame and commutator head and is fitted with a quick make-and-break two-pole trigger switch and a three-jaw screw-back



chuck for straight shank drills. The total weight is 27 lb. *United States Electrical Tool Company, Cincinnati, Ohio. Jan. 1, 1929, page 31.*

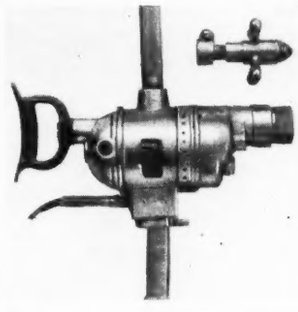
Half-Inch Electric Drill

In this drill the motor operates on either alternating or direct current. It has a no-load speed of 540 r.p.m. and a full-load speed of 300 r.p.m. The armature is carried on ball bearings. Hardened alloy-steel gears are used in the speed reduction between armature and chuck.

The drill is equipped with a combination spade and breast-plate handle and three-jaw screw-back chuck. It is furnished for use with 32-, 110-, 220- and 250-volt circuits. The drilling capacity is ½-in. steel, the weight 14 lb., and the over-all length 15⅜ in. *The Van Dorn Electric Tool Company, Cleveland. Feb. 7, page 265.*

Portable Electric Drill

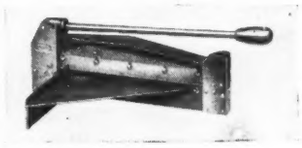
A line of heavy-duty portable electric drills made in two styles and in five sizes rated at ¼- and 5/16-in. with a grip handle and at ⅜-, 7/16- and 1-in. equipped with a Morse taper socket, spade handle and a feed screw. The drills



have universal-type motors chrome-nickel steel gears, anti-friction ball bearings and aluminum motor housings. *Standard Electric Tool Company, Cincinnati. Aug. 28, page 367.*

Cutter for Belts Up to 10-in.

This is a 10-in. open-end belt cutter that is comparatively light in weight and readily portable. As a measure of safety it is so constructed as to make



it impossible to raise the blade high enough to become dangerous. *Clipper Belt Lacer Company, 974 Front Ave., N. W., Grand Rapids, Mich. Oct. 16, page 650.*

Packing Cutter

The packing cutter shown is designed to cut piston and valve-stem packing of any size from ¼- to 1-in. to fit any size stem or rod from ½ to 7 in. in diameter. The dial on the cutter is graduated to give the correct length for any size packing and any size rod within the range of the machine.

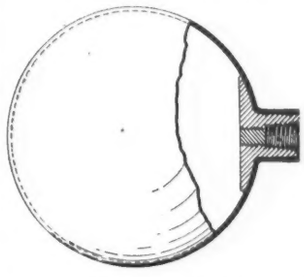
The stop is moved to the proper graduation on the dial

and tightened by the thumbnut. The end of the packing is first cut with the knife to give it the proper bevel. Then that end is laid against the stop and held in place with one hand while the knife is moved forward with the lever.

The knife is made of saw steel and is actuated by a rack and pinion with teeth cut from solid steel. *Chickasaw Machine & Foundry Company, Memphis, Tenn. May 22, page 922.*

Ediplate Float Made by Electrodeposition

This one-piece float is manufactured by the process of electrodeposition. The float shell is built up on a plastic core with which is incorporated the spud connection casting. On completion of the electrodeposition operation the plastic core is melted out through an opening at the base of the spud connection, after which this opening is sealed with a plug of the same material as the spud. The float is then reinforced by further plating in the zone adjacent to the spud connection. These floats are available in copper, nickel and chromium-plated copper for working pressures of from 25 to 300 lb. Spherical sizes are available in ½-in. diam-

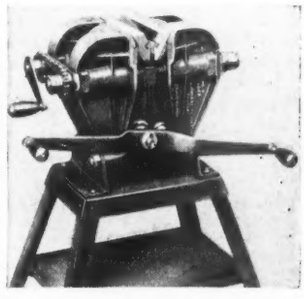


eter ranges from 3- to 5-in. and in one-inch diameter ranges from 5- to 8-in. *Ediplate Corp., T. A. Edison Industries, Orange, N. J. Jan. 22, 1929, page 143.*

Single-Operation Belt Lacer

The No. 8 belt lacer illustrated is designed to lace one end of a belt, in any width up to 8 in., in one operation. The belt hooks are spaced in position by the spacer bar inserted in grooves in the jaws of the machine.

The end of the belt is placed in the open hooks against the bar and the jaws are then



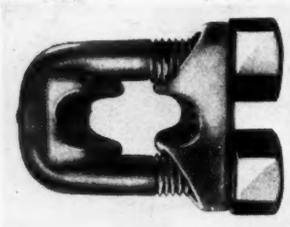
forced together by a turn of the crank on the front of the machine. The force exerted by the jaws puts the hooks into the belt evenly and embeds them flush with the surface. The machine may be bolted to a workbench or furnished with a stand, as shown in the illustration. *Clipper Belt Lacer Company, Grand Rapids, Mich. May 22, page 922.*

Aluminum Solder

An aluminum solder known as "Soldalume" is available in the form of a white powder which solders at 350 to 400 deg. F. and is said to give a high ultimate strength of joint. It is also put out in three types of sticks, for tinning, building up, and welding. *Aluminum Solder Corp. of America, 730 Fifth Ave., New York. Dec. 4, page 938.*

Cable Clip Has Two Grooved Jaws

Made of steel and bronze in a full range of sizes, this cable clip has large holding surface provided by two fully grooved jaws. The surfaces of both the top and bottom plates are



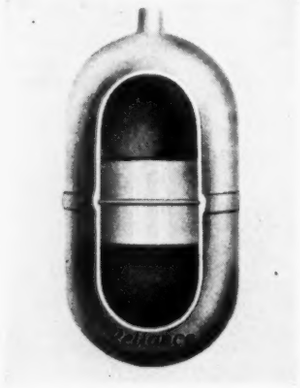
grooved for the lay of the cable, the extra grooved jaw is peened to the U no matter how tightly the nuts are pulled down. This grooving prevents distortion of the cable. *Eureka Metal Products Corp., North East, Pa. Oct. 9, page 611.*

Torfoleum Insulating Material

A type of insulating material, known as Torfoleum. This insulation, of which dried peat moss is the basic material, is especially suitable for use in ice making plants, cold-storage plants, for roof insulation and sound quieting and similar uses, where the temperature does not exceed 230 deg. F. It is made in sheet form 19½ x 39 in. from 1 to 6 in. thick. *Pennrich & Company, 29 Broadway, New York City. Oct. 23, page 689.*

Monel-Metal Float for High Pressures

The Monel-metal shell of this float is made in the form of two cups, which are pressed onto a steel bracing ring and then welded. The edges of the shell



are slightly belled on the inner side, so that when the two halves meet they form a groove into which a rib on the bracing ring snugs. The halves are welded together at the joint. *Reliance Gauge Column Company, Cleveland. Sept. 4, page 420.*

Newark Testing Sieve

A feature of this testing sieve is that the inside corner is rounded instead of sharp. Also, all soldering is done on the outside and not on the inside, thus permitting repair without distorting the cloth. These sieves are made in 3, 5, 6, 8, 10 and 12

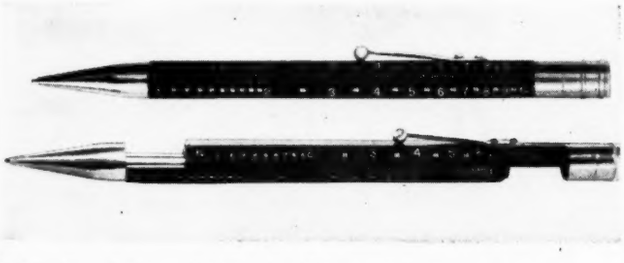
in. diameters and in accordance with U. S. Bureau of Standards specifications. *Newark Wire Cloth Company, 351-365 Verona Ave., Newark, N. J. July 3, page 32.*

Corrosion Resisting Paint

A corrosion-resistant paint consisting of an emulsion of asphalt and water. As no solvents are introduced in the manufacture of the emulsion, the coating produced by its use possesses all the resistance of pure asphalt. *Paint and Varnish Div. E. I. du Pont de Nemours & Company, Wilmington, Del. Dec. 4, page 938.*

Combination Slide Rule and Automatic Pencil

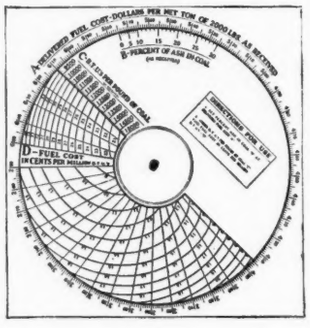
The illustration shows a combination slide rule and automatic pencil, designed for calculations involving multiplication, division, percentages and proportions. The over-all length is 6½ in. and it can be readily carried in the vest pocket. The logarithmic scale is 4 in. long. The barrel is made of Bakelite and is split in half, the halves sliding in relation to each other by means of a metallic strip and groove on the inside of the barrel. The pencil movement in either direction is controlled by a movable sleeve at the lower end. *Ruxton Multi-Vider Corporation, Graybar Building, New York. Dec. 4, page 937.*



Fuel Value Computer

This is a form of slide rule, known as "Fuel Value Computer," arranged to make easy the calculation of the cost of fuel per million available B.t.u. when the delivered cost, ash content and calorific value are known.

Based on good combustion engineering practice, the scales are so calculated that the fixed charges that must be made against any given coal due to the ash content are automatically taken care of with one setting of the scale. The delivered cost



per ton (2,000 lb.) of coal is set on scale *A* against the ash content on scale *B*. Opposite the calorific value on scale *C* may be read the cost per million B.t.u. The back of the computer carries tables for conversion of cost on a long-ton basis to that on a 2,000-lb. basis. *Coal Specialties Company, 50 Church St., New York. May 8, page 823.*

"Ladle Bronze" Quaker Babbitt Metal

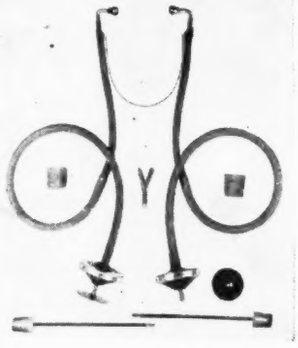
A bearing metal designated as "Ladle Bronze" and adaptable to practically all types of bearings and especially those subjected to extremely heavy pressures. This metal can be heated and poured in the usual way and gives a good bearing surface without machining. It pours freely and adheres readily to bronze, steel or iron linings, and in addition to its high strength and ability to withstand high pressures per unit of area, its weight per cubic inch is less than many other classes of babbitt. Its physical properties are as follows: Brinell hardness, 64.6; tensile strength, 21,500 lb. per sq.in.; compression of 1-in. cube at 14,000 lb., 0.002 in.; melting point, 860 deg. F., and weight per cubic inch, 0.233 pound. *Monarch Metal Company, 119 So. Lincoln St., Chicago. Oct. 30, page 731.*

Ammonia Liquid Level Gage With Vacuum Jacket

A gage tube with a vacuum jacket which acts an insulator to keep moisture from frosting the glass. The gage which is known as the "Lo-side" is designed for use on shell and tube brine coolers of either the submerged or insulated types as well as on accumulators.

The gage consists of two glass tubes. The inner glass serves to show the liquid level and outer tube forms a vacuum jacket and insulates the glass. The spiral part of the tube at the top forms a spring and allows for expansion and contraction. The jacket tube is silvered to repel radiated heat.

The complete gage is fitted with a valve having a safety ball check at top and bottom and with a pipe between the valves parallel with the glass. The length of the glass in sight is 15 in. and valves are 24¾ in. on center. *Meade Goodloe, 1830 West Slauson Ave., Los Angeles, Calif. Sept. 11, page 454.*



Transmit-O-Phone, a Sound Locater

This instrument has been designed with a view to making it possible for an engineer to locate more readily and accurately the exact position of a knock in

engines, or to detect leaky valves, traps, etc. It consists of a headpiece, twin amplifiers with connecting hose, vibration disks and sound-transmitting rods with corks to clarify and cushion the sounds.

The advantage of the two amplifiers over one, as generally used on instruments of this kind, is that the location of the knock is more readily determined, and it permits the operator to distinguish two different sounds in close proximity to each other or to detect sounds from two different points at the same time.

The ear tabs are offset to fit snugly in each ear and to keep out external sounds. Additional disks are provided for locating light sounds, and rods with the cork tips for sharp or loud sounds, the corks having a cushioning and clarifying effect. *International Metal & Specialty Company, Berlin, N. J. May 8, page 825.*

Oil Pumps, Lubricators and Filters

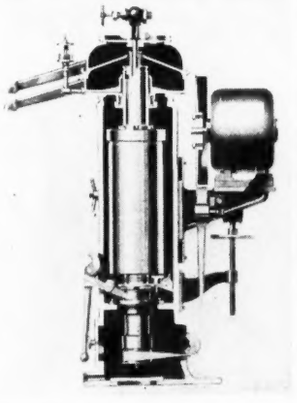
Several types of centrifugal oil purifying apparatus, combined centrifuge and filter presses, oil pumps and pneumatic grease lubricating systems are included in this section.

Separator and Clarifier for Lubricating, Transformer and Fuel Oils

This centrifugal separator is readily convertible into a filter and clarifier, and is especially adaptable to the separating of water and other foreign matter from lubricating, fuel and transformer oil.

The unit is designed not only to separate liquids of different specific gravities, but also to clarify the liquids at the same time.

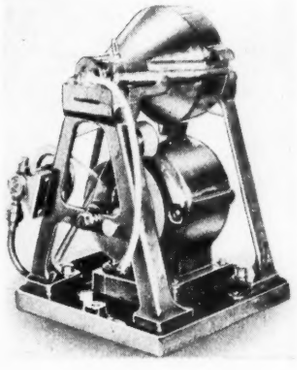
When used as a clarifier, a filtering sleeve of filter paper or other similar material is placed



between the inner and outer revolving sleeves of the machine. The hydraulic pressure developed in the rotation drives the liquid through the filtering sleeve at a high rate, thereby adding to the centrifugal action a secondary filtering action which eliminates the fine foreign matter. The machine is made in the stationary type, with open or closed feeds, and in the portable type with independently motor-driven supply pump. *Positive Machinery Division of the National Acme Company, Cleveland, Ohio. Jan. 10, page 78.*

Small-Capacity Oil Clarifier

A small oil clarifier suitable for use with high-pressure compression equipment and Diesel engines. The unit is known as the 17-H machine and is rated at 17 to 18 g.p.h. It consists of



a base upon which is mounted a small motor, belt connected to a horizontal bowl of the usual De Laval disk construction. Water and dirt removed from the oil are retained in the bowl, which ordinarily requires cleaning two or three times a week. A small gear pump controls the oil circulation from the lubricating system of the compressor or engine running with the clarifier. *De Laval Separator Company, 165 Broadway, New York. Oct. 9, page 612.*

WHIZ-ard Model B-3 Centrifuge

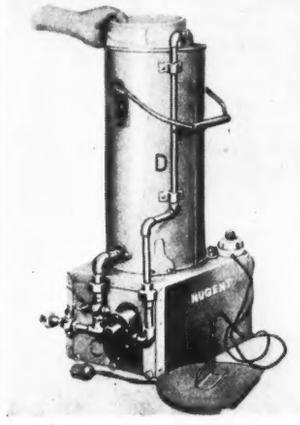
A small capacity centrifuge for purifying fuel and lubricating oil for Diesel engines (up to 500 hp.). The unit is designed for mounting on the wall or engine frame and to be piped permanently into the system. A ½-hp. vertical-type motor is

bolted to the bottom of the bowl chamber, and the bowl itself is mounted directly on the motor spindle. The oil feed is arranged for gravity or pump, and a flexible connection is provided between the feed connection on the bowl chamber and the central connection to the top of the bowl.

The bowl is 4¾ in. in diameter, 3 in. long and weighs only 4 lb. It has a dirt-holding capacity of 26 cu.in., or approximately 1½ lb. The machine has a capacity of 15 to 25 gal. per hour with fuel oil and 15 to 20 gal. with lubricating oil. The dimensions of the machine are, height, 18 in.; diameter, 10 in.; and the weight is 66 lb. *Sharples Specialty Company, 23rd and Westmoreland Sts., Philadelphia, Pa. Aug. 14, page 286.*

Portable Motor-Driven Continuous-Flow Oil Filter

This portable motor-driven filter, with a capacity of 6 gal. per hour, is especially adapted for filtering the oil from any



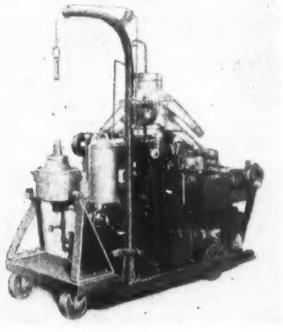
inclosed type of machine, such as reduction gears, engine crankcases and similar equipment. A flexible-hose suction pipe furnished with the filter is run from the pump on the filter to the oil chamber on the machine, and the clean oil discharge is carried back to the machine.

The filtering medium consists of three filtering bags. The inside bag is made of medium-weight muslin, the center and outside ones are of material of special texture and thickness.

The unit can be supplied with a light angle-iron stand 31 in. high, if desired. This stand is used to elevate the filter, to make it more convenient and to facilitate the flow of oil back to the machine. The base of the machine is 9½x13½ in. overall, and the total height without the stand is 24 in., and with it, 55 in. The weight of the filter and motor complete is 35 pounds. *William W. Nugent & Company, 410 N. Hermitage Ave., Chicago, Ill. June 19, page 1117.*

De Laval Portable Oil Purifier No. 700

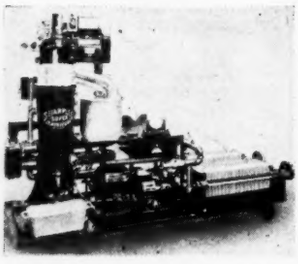
This portable insulating oil urifier consists essentially of an all-steel truck, on which are mounted the following units: An oil purifier unit, having a



maximum capacity of 800 gal. per hour; a 12-in. blotter press; three 6-kw. immersion electric heaters; two rotary pumps with motor; thermostatic heating cut-out; bowl-cleaning vise and hoist; thermometer and clean-oil collecting tank with a float valve to regulate the flow of oil through the machine. The complete outfit is so piped as to give four combinations of operation:

The construction and operation of the oil purifier are essentially the same as found in other De Laval machines. The purifier also can be furnished as a non-aërating conservator type unit for use in connection with conservator transformers or as a stationary unit. The 12-in. blotter press is provided for use in series with the purifier, for treating badly carbonized oil, but for all other services it can be readily cut out of the line. The swinging hoist, which is mounted on one corner of the

truck, materially lessens the manual labor in handling the outfit and saves time in cleaning the bowl. The motors on both the purifier and the pump are equipped with push-button control. *De Laval Separator Company, 165 Broadway, New York. Aug. 28, page 367.*



Combined Portable Centrifuge and Filter Press

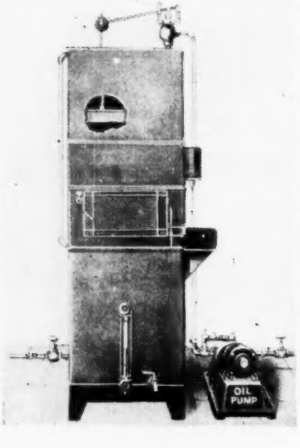
A combined portable centrifuge and filter press having a capacity of 900 gal. per hour. With new oil the total capacity can be fed through both presses at a pressure of 15 lb. and through a single press at a pressure of 25 pounds.

The unit is assembled complete with motor, pumps, piping and valves. The piping is so arranged that the oil can be run through the centrifuge only and discharged directly to storage without passing through the presses. Valves are also arranged so that either press may be cut off at will. The machine is equipped with four 6-kw. heaters. A sheet-metal cover is provided to protect the filter presses and a portion of the pump from dirt when not in service. *Sharples Specialty Company, Philadelphia, Pa. Dec. 25, page 1054.*

Continuous and Automatic Fuel-Oil Filter

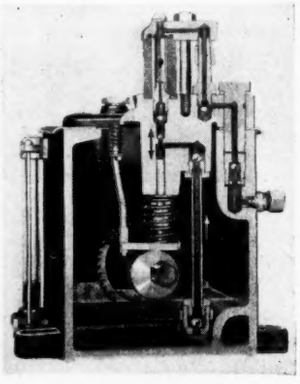
A type of continuous and automatic fuel-oil filter, designed especially for cleaning oil for Diesel engines and oil burners.

The filter is divided into three compartments—a heating chamber, a water separating chamber and a filtering and clean-oil storage chamber. The heating chamber is normally fitted with either a steam, a hot-water or an electric coil. After passing through the oil separating chamber, the oil goes to filtering baskets composed of wire cloth of 100- to 250-mesh, and thence to the clean-oil storage chamber. The filtering baskets are readily removed through a door on the top of the compartment. They can be cleaned separately by shutting off the oil to one basket at a time. *Wm. W. Nugent & Company, Inc., 410 N. Hermitage Ave., Chicago, Ill. Aug. 28, page 365.*



Model "F" Force Feed Lubricator For Diesel Engines and Air Compressors

Designed for the timed lubrication of Diesel engine cylinders, air compressors and similar equipment, this model "K" lubricator is similar in many respects to the model "F" made by the same manufacturer.



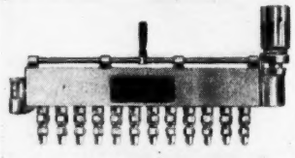
When applied to Diesel engines, the lubricator is driven from the layshaft of the engine by means of a chain and sprocket or by a set of gears, and can be adjusted so that the plungers operate in synchronism with the engine piston, the oil being delivered to the piston at the end of the power stroke. On large engines requiring the injection of oil at several points in each cylinder, multiple-feed lubricators are used with the required number of feeds for each cylinder, arranged to operate simultaneously.

The lubricators are also particularly adaptable for air-compressor lubrication, and where the air and lubrication cylinders operate under totally different conditions, requiring different grades of oil, the lubricator is furnished, when desired, with two compartments, the larger containing the units for lubricating the power cylinders and the smaller those for the air cylinders.

They can be set to feed a minimum of one drop every eight strokes of the plunger or a maximum of twelve drops to one stroke of the plunger. Lubricators of from one to sixteen feeds are available, and units with more than sixteen feeds can be furnished. *American Oil Pump & Tank Company, Cincinnati, Ohio. Dec. 11, page 981.*

Multiple-Feed Oiler

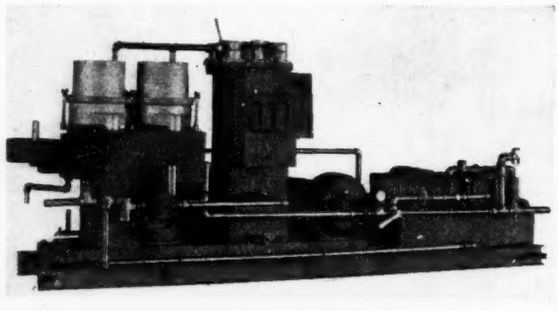
When the reservoir of this multiple-lead wick-feed oiler is filled to capacity, the valve stems inside also become filled with oil. When the hand lever on top is raised, oil flows through the valve stems and valves until the level reaches the top of the valve stems. After this, capillary action through the wick produces a continuous flow of oil to the bearings until the hand lever is pushed down to close the valves.



If certain bearings require more lubrication than others, several wicks may be used in each valve stem or two or more leads may be connected to these bearings. *Gits Brothers Manufacturing Company, 1940 South Kilbourn Ave., Chicago, Ill. July 17, page 121.*

Large-Capacity Purifying Unit for Transformer and Switch Insulating Oils

A large-capacity oil purifying unit to dehydrate and purify transformer and switch insulating oils. The machine uses twin bowls. Before entering the separators, the oil passes through a heater which raises its temperature. From the separator the oil passes through a pressure settling tank, where the air is dispelled, and then is forced through a twin filter press. The oil, as it comes from the filter press, is passed through a continuous test chamber equipped with a relay and bypass valve, so that only oil of the desired dielectric strength can pass through to the switch, transformer or storage tank.



The machine is made in both stationary and portable types and in various combinations to suit specific requirements. *Hydroil Corporation, Lebanon, Ind. April 17, page 699.*

Automatic Oil Economizer

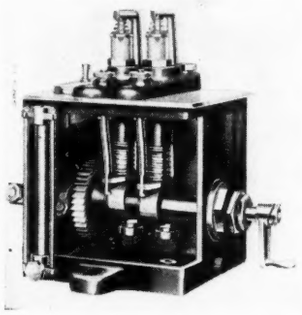
This automatic oil economizer consists of a multiplex lubricator of liberal capacity with individual adjustable sight feeds for all bearings requiring gravity lubrication.

Control of the flow of oil is effected by the diaphragm which is connected by suitable piping to the discharge pressure of the unit to which it is fitted. When the unit is in operation, the discharge pressure is transmitted to the diaphragm, pushing it upward and, by means of the frame around the diaphragm, raising the needle valve that controls the outlet to the oil container. As soon as the unit is shut down and the pressure under the diaphragm is released, the diaphragm settles back to normal position and in so doing stops the flow of oil to the bearings. The oil flow is thus maintained only when the unit is running. *Yeomans Brothers Company, 1433 Dayton St., Chicago, Ill. March 13, page 484.*

Force-Feed Lubricator with Individual Removable Pumping Units

In this force-feed lubricator (Model F) one pumping unit is used for each feed and is entirely separate and removable from the reservoir without disturbing any other unit.

Each pumping unit is driven by a shaft fitted with a cam for

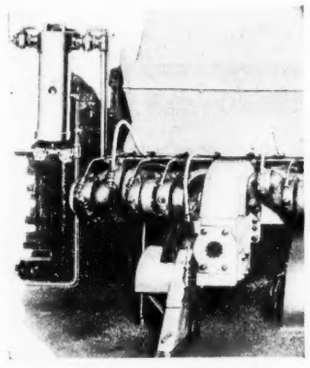


each unit. The plungers are raised to the same height at all adjustments of the stroke, the length of the stroke being adjusted by limiting the downward travel by means of a rod and knurled nut on the top of the pump body.

A heating chamber is provided in the oil reservoir so that the oil can be heated when heavy oil is used or when the oil is exposed to low temperatures. The shaft is driven through a ratchet and pawl, and an auxiliary crank is furnished for supplying extra oil at starting or for supplementing the regular feed. *American Oil Pump & Tank Company, Cincinnati, Ohio. Nov. 6, page 772.*

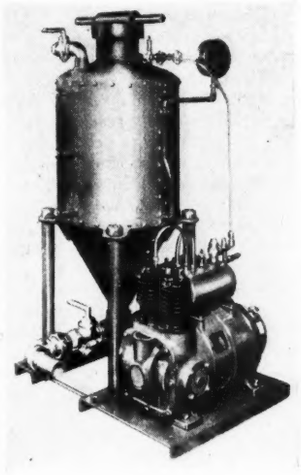
Pressure Grease Lubricating System

This greasing system consists of a controlling valve and pressure unit or distributor. The distributor is placed at some convenient point adjacent to the



machine to be lubricated, and a main distributing pipe is carried across the machine with a small rigid or flexible connection to each bearing. The upper end of the cylinder is the grease reservoir, which is filled by removing the top with the piston in the down position. When the top is replaced, steam, air or water pressure is admitted at the bottom, and this causes the piston to rise and force the lubricant out through the connections at the top to the various bearings.

The amount of grease supplied to each bearing is controlled by a regulating valve having a movable core which varies the frictional resistance through the valve. This valve provides a ready means of compensating for the drop in pressure due to the length of pipe line through which the grease is forced. Once the correct position of the core is determined, it is locked in position by a jam nut. *The Ideal Lubricator Company, 2120 Packard Building, Philadelphia, Pa. Feb. 28, page 398.*



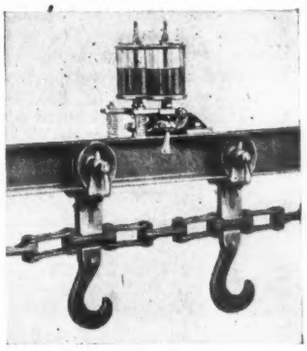
Pneumatic Centralized Greasing Station

This central pneumatic lubricating system is designed for feeding grease through one or more header lines with connecting leads to practically any number of bearings and at varying distances from the unit up to a total of 300 ft. The pressure unit consists of a conical-base grease tank and an automatically controlled motor-driven air compressor mounted on a common base. The compressor is regulated to maintain the pressure between the limits of 170 and 210 lb. A one-inch connection is provided at the top of the tank to permit filling the tank by pumping the grease directly into it and a large opening at the top for filling with grease that will not permit of pumping.

The unit is placed at some convenient position and piped to the numerous bearings with converter cups and the necessary stopcocks, check valves and a regulating valve at each bearing. The converter cup is designed to maintain a pressure on a section of a system feeding a number of bearings. A pressure reduction valve is inserted in the lead line at each bearing and is adjusted to give proper feed of grease for the type of bearing being lubricated. The lubricator units are made in two sizes, with a grease capacity of 150 and 450 lb. respectively. *The Keystone Lubricating Company, Philadelphia, Pa. March 6, page 441.*

Automatic Conveyor Lubricator

The lubricator consists of a sight-feed lubricator and a wiper brush which contacts with an oil spout on the conveyor wheel. The brush is kept in the proper position by means of a spring. The oil-laden brush delivers oil to the bearing by the



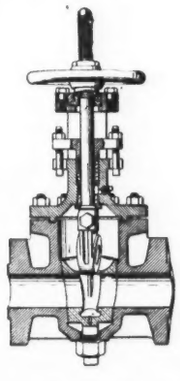
wiping contact against an oil spout. Ball- and roller-bearing wheels, as well as dustproof wheels, may be used. The lubricator is also readily adaptable to the various types of bucket elevators, industrial conveyors and similar equipment. *Saginaw Stamping & Tool Company, Saginaw, Mich. Oct. 2, page 574.*

Piping, Valves and Fittings

Gate and globe valves for high pressures and temperatures, tandem boiler blowoff valves, small motor valve operating unit and a number of new tools to facilitate pipe work, are important additions to the line of valves and fittings.

Supertest Gate and Globe Valves

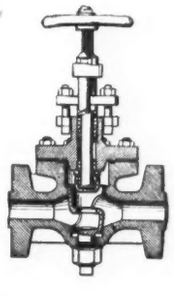
The principal feature of this line of valves, which is made in the gate and globe types and for high pressures and tempera-



tures, is the employment of a tapered removable cage in which is embodied the valve seats. The cage may be utilized to shut off the flow through the valve while repairs are being made. The cage is provided with an external take-up to compensate for the expansion and contraction and prevent leakage between the walls of the cage and the main valve body. The valve cage in the gate type has guides that control the path of travel of the gate and prevent rubbing of the surfaces. The gate faces are removable and may be replaced when worn or adjusted when desired. The one-piece valve bodies, as well as the bonnets, are of forged steel. The cages, glands, stems, bushings and gate seats are of stainless steel.

The gate valves are of the rising stem type and have a straightway flow. The body and cover flanges have tongue-and-grooved joints for soft steel corrugated gaskets.

The globe valves have forged steel bodies and bonnets with

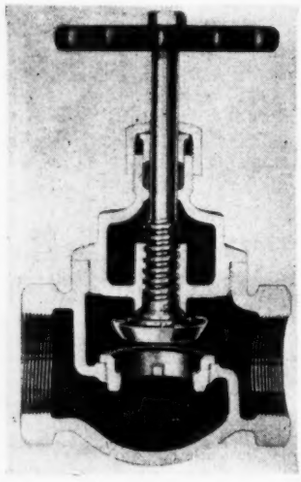


either inside screw or outside screw and yoke, and the removable cage construction al-

lows full capacity openings through the valve. The globe valves are made in ¾- to 3-in. sizes and the gate valves from 1- to 6-in. Sizes up to 24-in. can be supplied. *Wellman-Seaver-Morgan Company, Cleveland, Ohio. April 17, page 698.*

Replate Self-Grinding Globe Valves

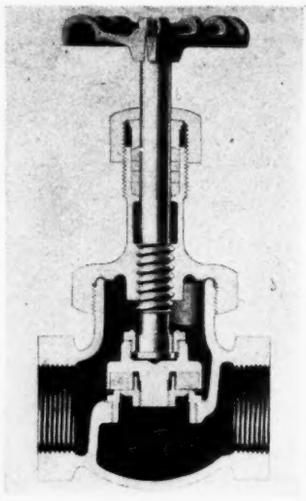
In this valve, which is made in globe, angle and Y bodies and designed for both high- and



low-pressure service, the head of the stem is capped with a removal cold-rolled nickel plate, formed to give a ball-joint effect and fully supported by the end of the stem. The head plate works against a Monel metal removable seat. The end of the stem is designed to seat in the open position to permit repacking the valve under pressure in the wide-open as well as the closed position. A large air space in the bonnet prevents rapid transmission of heat from the body to the handle, and the short stem and bonnet reduce to a minimum the space required for an installation. *Central Valve Manufacturing Company, Chicago, Ill. Aug. 21, page 330.*

Bronze Valve for 250-Lb. Pressure

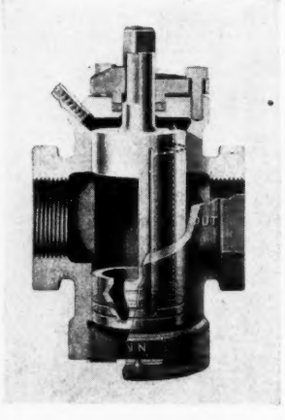
In this line of valves, which comprises globe, angle, cross and horizontal and angle check patterns, renewable resilient disks suitable for 250 lb. working pressure are used. The valves are made in sizes ranging from ¼- to 2-in., either screwed or flanged. The globe, angle and cross patterns are furnished with renewable seat rings. The bonnet screws over the body, and the bonnet seat joint is rounded. Other features of the line include non-heat handwheel, deep stuffing box, and manganese bronze spindle with large threads, all



of which are in contact with the bonnet threads when the valve is closed. *Jenkins Brothers. New York. Oct. 2, page 574.*

MacGregor Rotary Valves

A self-lubricating valve with a positive seal that turns freely and is adaptable to straightway or angle connections in liquid or gas lines in practically all types of industrial service. The valve has two principal parts, a cylindrical rotor and a valve body. The rotor is a cylinder closed at the top and open at the bottom; the rotor is free to move up and down and opens and closes on a quarter-turn. Between the valve head and the top of the rotor is the lubricant reservoir, which is filled with lubricating compound. As the valve is opened and closed, the



lubricant in the rotor grooves wipes the inner walls of the valve body and establishes a thin sealing film between the bearing surfaces. The sealing action of the valve results from the maintenance of this lubricating film and the neutralization of the pipe line and lubricant pressures.

These valves are normally furnished in 150-lb. cast iron or semi-steel flanged or screw straightway, angle or multiport construction. Also, they can be furnished in corrosion esisting metal, such as Duraloy, lead, aluminum and special alloys. *MacGregor Valve Company, St. Louis, Mo. Oct. 2, page 572.*

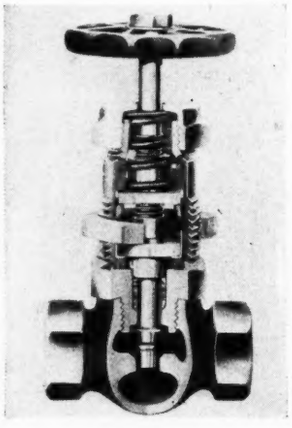
Tandem Boiler Blowoff Valve

This blowoff valve (illustrated on the insert) is designed to obviate the effect of wiredrawing and has the two valves incorporated in one body. The valve nearer the boiler is of the rotating gate type and is intended to be opened first and closed last. The gate member is conical in shape, and provision is made for lifting it off its seat to prevent scratching. It is a one-piece stainless-steel forging, hardened and ground. The operating lever of this valve is locked in both the open and closed position by a projection which fits into an index plate.

The main blowdown valve which controls the actual blowdown has a sealing disk and a check disk. The sealing disk is provided with a by-pass valve to equalize the pressure, while the sealing disk is being opened and closed. The check disk is in series with the main disk and the bypass, and takes all the wear and wiredrawing of the actual opening and closing under pressure and flow. The function of the check disk is merely to hold the pressure while the sealing valve is being seated or unseated. In operation the rotary gage valve is opened first, then the hand wheel of the main valve is backed out sufficiently to raise the bypass valve which equalizes the pressure on the sealing disk. Further backing off lifts the sealing disk away from its seat and complete backing off lifts the check disk out of the path of flow through the valve. The operation of closing the valve is performed in reverse order. *Cochrane Corporation, Philadelphia, Pa. Oct. 9, page 610.*

Perfection Self-Grinding Valves

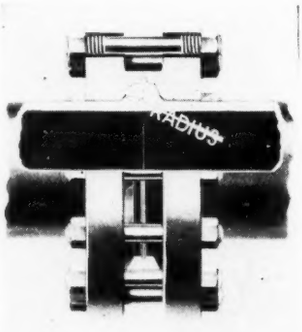
The feature of this valve is the use of a short spiral spring and spring block threaded to the valve stem which forces the valve to its seat. This feature causes the disk to be revolved on the seat when the valve is being closed, and this tends to remove any dirt or scale from the seat. As the stem comes to a seat in the body, the threaded section of the stem being engaged with the thread in the spring block, the latter moves upward on the stem compressing the spring. Further rotation of the stem brings the spring block solidly against the upper stop in the bonnet and the valve to a firm seat. The stem threads, spring and spring block are on the outside of the bonnet above the packing, where they can be readily lubricated and are not subjected to the effects of heat and corrosion. To control the grinding pressure on the seat according



to the varying operating pressures and hardness of the impurities encountered the spring retaining cap at the top of the bonnet may be adjusted up or down within a definite range. The valves are intended for working pressures to 300 lb. gage and temperatures to 550 deg. Gage cocks designed on the same principle are also available. *Central Valve Manufacturing Company, Chicago, Ill. Aug. 21, page 330.*

"Globack" High-Pressure Pipe Joint

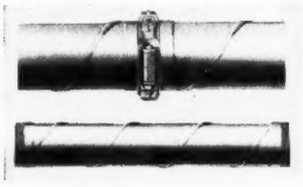
In this high-pressure pipe joint, known as the "Globack," the back of the pipe lap is made spherical in shape, giving a thickness in the lap section practically twice the thickness of the original pipe wall. The



flange bearing surfaces are also spherically machined. The laps have an extended lip to facilitate welding after the pipe is erected. These joints are available for 600, 900, and 1,350 lb. working steam pressures. *The Midwest Piping & Supply Company, St. Louis, Mo. Feb. 28, page 387.*

Naylor Spiral Pipe of Toncan Iron with Threaded and Grooved Ends

This pipe is now made of Toncan iron in sizes from 4 to 12 in. in diameter and 20-ft. lengths, fitted with grooved ends for Victaulic couplings, with threaded ends for standard screw fittings, or with flanged



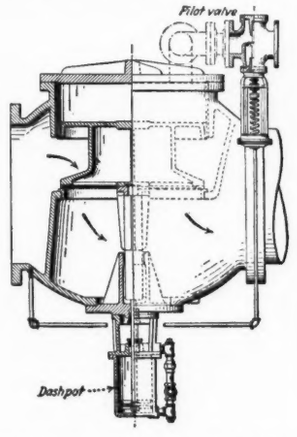
ends for standard flanged fittings.

In making the pipe, a strap of sheet steel is wound into a spiral shape, then the edges are automatically flanged and formed into a four-ply lock seam laid up on the outside of the pipe. For higher pressures the spiral seam is welded to the wall to give additional strength. *The Naylor Spiral Pipe Company, 1230 East 92nd St., Chicago, Ill. April 10, page 656.*

Pilot-Actuated Back-Pressure Valve

The illustrated pilot-actuated back-pressure valve is designed for instantly relieving any pressures up to 250 lb. It is fitted with a flat-seat poppet to which is rigidly connected a piston of somewhat larger diameter. The operation of the valve is controlled by holding or relieving the pressure from the chamber above this piston by means of a pilot valve.

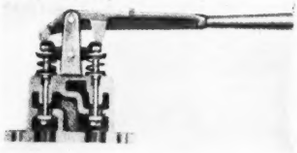
A cushion chamber or dash-



pot is connected to the lower end of the valve spindle by means of which the speed at which the valve will open or close, can be regulated. The valve is made in standard pipe sizes from 6- to 28-in. *Atwood & Morrill Company, Salem, Mass. Dec. 18, page 1014.*

Operating Valve for Single- and Double-Acting Cylinders

Operating valves of the three- and four-way types for the control of single- and double-acting air cylinders are available. All the ports are on one face, so that the valve can be

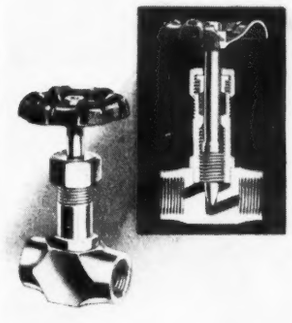


mounted on a plate to which the piping is attached. The valve has a flexible seat which obviates the necessity for lapping or grinding when servicing is required. It is made in two styles, 5-P for double-acting cylinders and 3-P for single-acting cylinders. Both styles are made in four sizes ⅜, ½, ¾, and 1¼ inch. *Ross Operating Valve Company, 6488 Epworth Blvd., Detroit, Mich. April 10, page 655.*

Needle Valves for Small Lines

A type of needle valve particularly suited for small refrigerating lines, oil-burner controls and measuring devices of other instruments where the control of liquids or gases is required.

The valve is made of bronze

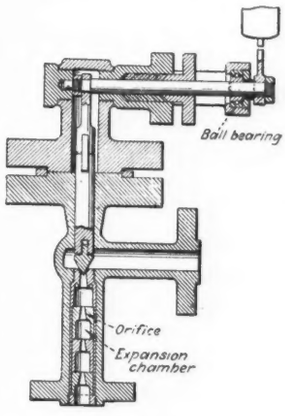


and can be had in both angle and globe types. *Pratt & Cady Division, Reading Steel Casting Company, Bridgeport, Conn. Jan. 22, 1929, page 144.*

Orifice Valve for High-Pressure Drainage Control

This valve is intended for use with the "Copes" condensate drainage control for high pressures. It is designed for use with pressures up to 1,500 lb. and to take the place of the single seat and disk valve which would be subjected to excessive erosion caused by condensate passing through the valve at high pressure.

The pressure reduction, from 1,500 lb. to atmospheric, is through a series of orifices and

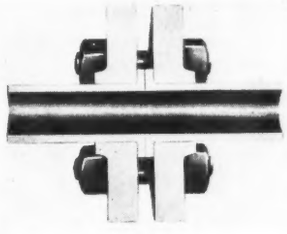


expansion chambers, so that the total pressure drop is distributed through several stages. The drop across the seat and disk of the valve is less than 300 lb. The valve is fitted with a deep stuffing box and an outboard ball bearing to support the extreme end of the shaft. The orifices and expansion chamber sections are carried in a special sleeve, the upper end of which forms the valve seat. *The Northern Equipment Company, Erie, Pa. Jan. 24, page 159.*

Flanged Pipe Joints for Drips, Drains and Bypasses

The standard types of high-pressure flanged joints are now available for use on drains, bypasses and other steam lines below two inches in diameter.

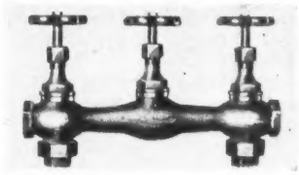
The Van Stone joint shown is ½-in. size., and is designed to withstand any present-day operating pressure and temperature. The lap has a thickness



equal to that of the tubing from which it is formed, even after facing the front and back of the flange. The radius of the flange and that of the lap are concentric, thus giving proper bearing to the flange. Flanged joints with the ends of each short section of pipe cupped for welding to a line are also available. *National Valve Manufacturing Company, Pittsburgh, Pa. Jan. 8, 1929, page 66.*

Schaefer Bypass

This bypass is designed to simplify the installation of a bypass on traps, reducing valves, pump governors and similar apparatus. It is made in the standard pattern for pressures

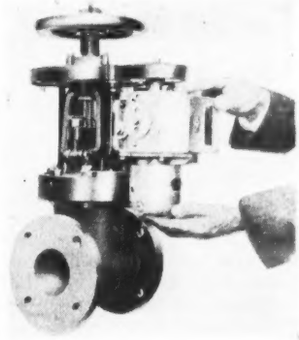


up to 150 lb., and in the extra-heavy pattern for pressures from 150 to 300 lb.

The valves are of the globe type and are fitted with renewable seats and disks of either the flat or cone type. The disk holder is guided in the bonnet and is held on the stem by a collar, no nuts or pins being used. The holder permits inserting disks of special material to suit the service on which the bypass is to be used. The extra-heavy pattern is furnished with renewable seats of Monel metal. The bypass is made in standard pipe sizes from ¼- to 3-in. *Frank H. Schaefer Company, Lafayette Building, Philadelphia, Pa. July 31, page 209.*

Type Ao Valve-Operating Unit for Valves up to Six Inches

This type Ao valve-operating unit supplements the regular line of "Dean" valve-operating units made by this company. The unit has been designed



especially for valves from one to six inches. It is self-contained with the speed reduction between the motor and the valve spindle made by means of spur-gears. A disengaging mechanism is provided for hand operation.

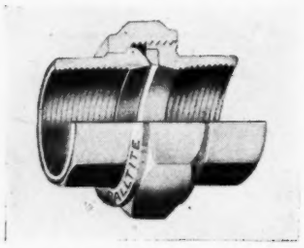
Reversing relays are mounted in a compartment of the gear reduction case. These relays are mechanically interlocked to allow the unit to operate in any position.

A special high-speed high-torque motor of 110 volts, for alternating or direct current is

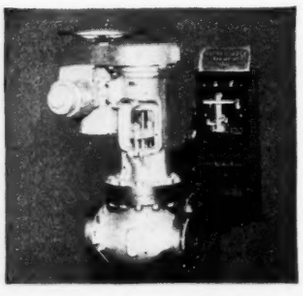
used for the driving unit, and is entirely waterproofed for outdoor service. *Cutler-Hammer Manufacturing Company, Milwaukee, Wis. Nov. 20, page 848.*

Balltite Union with Ground-Joint Metal Gasket

A feature of this union, known as "Balltite," is the substitution of a renewable metal ball-joint gasket for the regular hand-cut washer. The union is made from malleable iron with octagon pipe ends and nut. The gasket is the wedge-seated ground joint type and is readily



renewable. Unions are available in sizes from ⅜- to 2-in. in black or galvanized. *Rhode Island Fittings Company, 123 Georgia Ave., Providence, R. I. Dec. 4, page 937.*



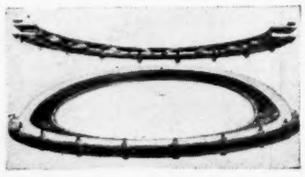
Motor-operated Valve With Tight Seating Relay

The valve illustrated is a 6-in., 400-lb., motor-operated globe valve equipped with a tight seating relay which permits the valve disk to travel to its seat under power and to break the electrical circuit at a predetermined torque independent of the setting of the limit switch. The relay can be mounted in any convenient location and operated from one or more push button stations. *The Lunkenheimer Company, Cincinnati, Ohio. Feb. 28, page 387.*

Turbine-Condenser Expansion Joint

In this turbine-condenser expansion joint a copper shield is expanded into place by inserting split steel rings upon which flat steel springs exert sufficient pressure to seal the joint properly with the flanged surfaces of turbine and condenser.

The joint may be installed in any position, horizontal or vertical, and will permit proper



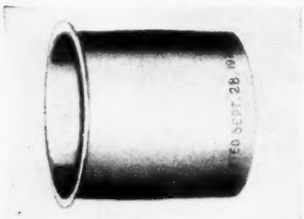
expansion in any direction without strain. It is adjustable to a pipe section of any shape—circular, rectangular or irregular. Gaskets of either asbestos or rubber are furnished with the joint. This joint is simple to install, as no bolting is done to either condenser or turbine. *Dennis Engineering Company, Columbus, Ohio. Aug. 28, page 365.*

Device to Protect Ends of Screwed Pipe

This device (known as a pipe saver) is designed to protect the ends of screwed pipe from erosive or corrosive action.

It is a piece of tubular metal made of an alloy that is practically impervious to the action of most fluids, and made to fit snugly inside the ends of pipe of any standard size. After the pipe is threaded and reamed, the thimble is dipped in oil and then inserted in the pipe and seated. The thimble is tapered slightly from the center to the ends in order to insure a permanent seating with varying pipe diameters.

In addition to protecting the ends of the pipe from wear and

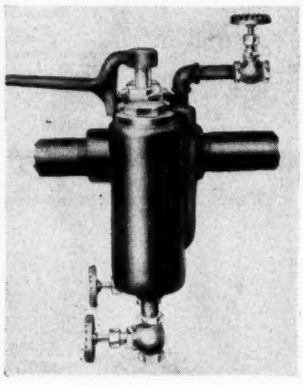


corrosion, the thimbles reinforce the pipe at the threaded section. *Pipe Saver Corporation, Carthage, N. Y. Aug. 28, page 366.*

Duplex Strainer

In this strainer a single shut-off valve is used to control the flow to both chambers, also a blowdown arrangement for cleaning the baskets without removing them from the body. The strainer has two chambers in one body with central valve or quarter-turn cock for controlling the flow to each chamber. The direction of flow through the strainer baskets is from the outside to the inside, so that the sediment collects in the chamber around the screen and is removed through a large drain.

Cleaning of the strainer is accomplished by reversing the flow through the basket. A blowout connection at the top is connected to a steam, compressed-air or water line as desired, and by moving the control cock to the off position for the chamber to be flushed or purged, it automatically connects the in-

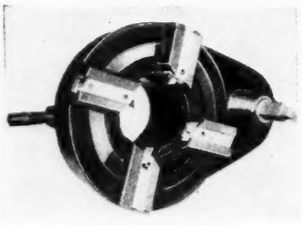


side of the basket with the blowout connection.

The strainers are available in three sizes, ½-, 2- and 4-in. suitable for pressures up to 250 lb. The bodies are of ferro steel and the baskets of perforated sheet brass. *Anthony Company, 138 West Ave., Long Island City, N. Y. July 31, page 208.*

Automatic Pipe Cutter

This No. 80 cutter for pipe in sizes from 4½-in. to 8-in. gives a straight square-end cut with the outside edge chamfered to facilitate the starting of the die. The knives are fed automatically, requiring no attention on the part of the operator. A single handwheel sets them for cutting or the quick return of the knives after the



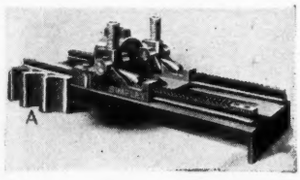
pipe is cut off. The cutter is operated either with the regular ratchet handle, or with a power drive. *Toledo Pipe Threading Machine Company, Toledo, Ohio. May 29, page 994.*

Pipe-Pushing Jack

An improved type of jack for pushing pipe through earth under roadways, railroad tracks and other similar locations to obviate excavating.

The jack is fitted with three tapered jaws, one set for each size of pipe, designed to give a gripping surface completely around the pipe, and thus obviate any tendency to flatten it. The length of travel at each setting is 25 inches.

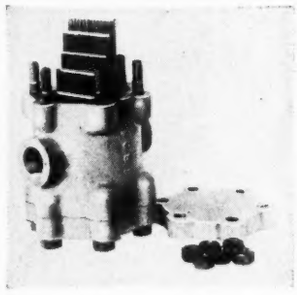
The jack is made in two sizes, No. 332 for pipe from ¾-



to 2-in. and the No. 334 for pipe from 2-to 4-in. Simplex steel pilots for screwing on the end of the pipe are furnished with the jacks when desired. *Templeton, Kenly & Company, Ltd., Chicago, Ill. Jan. 1, 1929, page 31.*

Pipe Line Tracyfier

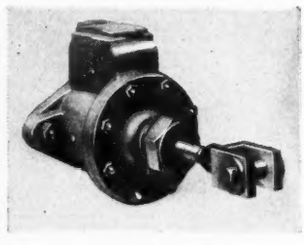
A pipe line Tracyfier for use in lines carrying steam, air, gas or water. This unit employs the same type of baffles as used in the boiler Tracyfier. It is made in standard pipe sizes, with screwed connections and



flanged covers, and is suitable for pressures up to 250 lb. *Andrews-Bradshaw Division of Blaw-Knox Company, Pittsburgh, Pa. Feb. 28, page 388.*

Device for Eliminating Pipe-Line Vibration

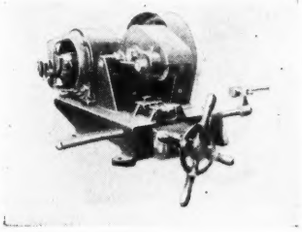
This device, which is designed to prevent the vibration in pipe lines, consist of a cylinder with oil well and a piston.



It functions in a similar way to a dashpot with a valved bypass.

The cylinder is secured to a wall or other fixed support, and the movable piston attached to the pipe between two fixed parts. The cylinder has an oil

well closed by a lid and fitted with small passages to either side of the piston. The sizes of the passages are such as to provide a damping effect on the movements of the piston, set up by the vibration of the pipe line. *Sulzer Bros, Winterthur, Switzerland. Jan. 1, 1929, page 31.*

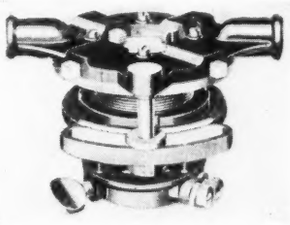


Power Pipe Cutter

This is a portable machine for cutting off pipe and tubes from one-fourth to two inches in diameter. The cutter disk contained in a movable arm is brought down on the pipe, which rests on rollers, thereby differing from the usual method of raising the rollers and pipe to the cutter disk. The machine has a length gage which can be set to cut any length nipple from "close" to three feet on either side of the cutter disk. The new cutter can be furnished in either belt- or motor-driven types. *Oster Manufacturing Company, Cleveland, Ohio. Oct. 23, page 691.*

New Beaver Pipe-Threading Machine

Simplicity and easier working with reduced weight are features of this new die stock. One set of dies is quickly set to thread 1-in. 1¼-, 1½-, or 2-in. without changing. The dies cannot become lost or mislaid because they are always in the tool, and they are quickly adjusted to thread under or over



standard size without affecting the length of the thread. No special dies are needed for brass pipe, a different setting only being required.

In the new work holder, or pipe-gripping device which centers the pipe, two knurled screws hold the pipe, leaving only the thumbscrew to be tightened after the die stock is placed on the pipe. *The Borden Company, Warren, Ohio. July 3, page 31.*

Dies for Brass Pipe

A line of dies for brass pipe only. The dies are designed for use with the standard Armstrong stocks and are made for

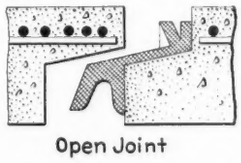
pipe sizes from ⅜- to 2-in. *Armstrong Manufacturing Company, Bridgeport, Conn. Sept. 25, page 534.*

Bituminous Lining for Steel Pipe

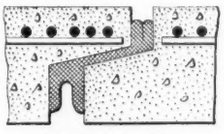
This lining, which consists of a molten bitumen especially treated and mixed with a chemically inert filter ground fine, is applied to the inside of the pipe by a centrifugal process, and gives a smooth surface having a glossy mirror-like finish. Pipe lined with this material can be furnished with any of the customary forms of exterior protection, and is available in sizes from 4-in. upward. The lining has a minimum thickness of one-quarter inch on all sizes. It provides a practical means of preventing corrosion and minimizing loss of capacity due to internal incrustations of tuberculation. Lengths available and type of couplings used are in accordance with conventional practice. *National Tube Company, Pittsburgh, Pa. Dec. 25, page 1055.*

Watertight Rubber Joints for Concrete Pipe

A jointing material of india rubber so designed that the water pressure against the joint tends to tighten it against the walls of the pipe. It also af-



Open Joint



Closed Joint

fords the pipe line a considerable amount of flexibility without developing leaks. The outside of the joint can be filled with asphalt or concrete. This joint is also adaptable to cast-iron, steel or wood pipe. *Leon Bille, 45 Grand-Rue, Nogent-sur-Marne (Seine), France. Nov. 13, page 810.*

"Trimo" Pipe Wrench

Increase in strength and safety are features of this improved pipe wrench. The strength of the swinging steel frame has also been materially increased. As an additional safeguard overlapping side lugs, an integral part of the handle,

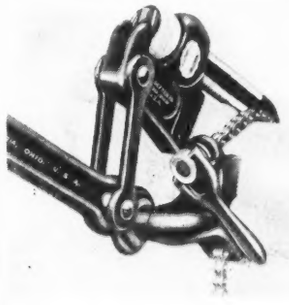
brace the frame against lateral distortion or spreading. The replaceable insert lower jaw and nut guard, which protect the adjustment, have been retained. *Trimont Company, Roxbury, Mass. Oct. 16, page 650.*

Graphite Seal for Pipe Threads and Gaskets

This new product is a graphite paste suitable for sealing screw threads, flange and gasket joints of pipe lines carrying hot or cold oils gasoline, etc. It is said to be insoluble in oils and gasoline, and to expand when subjected to heat, thus giving leakproof joints. It is also recommended for use on handhole and manhole plates or wherever there is a flange and gasket connection, and owing to the graphite properties of the paste, the joints may be opened easily after a long period of time. *Joseph Dixon Crucible Company, Jersey City, N. J. Oct. 30, page 731.*

Pipe Wrench with Compound Leverage

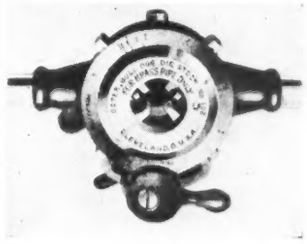
This pipe wrench has a compound leverage, which, it is claimed, gives it fourteen times the leverage of a standard 48-in. wrench, although the handle is no longer than that of a 36-



in. wrench. The end of the lever is hinged to a toothed trunnion which is rigidly clamped to the pipe by means of a chain, while the adjustable jaws of the wrench are on the fitting to be tightened. As the jaws are connected to the lever by means of a link, a pull exerted on the lever tends to turn the pipe and fitting in opposite directions or to screw them tighter together. To unscrew a joint, the wrench is simply reversed. As the link is connected to the lever close to the trunnion, a powerful leverage is obtained. Also, since the action of the jaws and the trunnion are counterbalanced or opposed, there is little strain exerted on the pipe line, and joints already tightened are not disturbed. The wrench is made in sizes up to 6-in. *Ridge Tool Company, Elyria, Ohio, May 1, page 782.*

Die Stock for Brass Pipe

Patterned after the Oster Bull-Dog Die Stock, this new die has the automatic, quick-acting feature specially designed for threading brass pipe, which eliminates any necessity for backing off over the finished



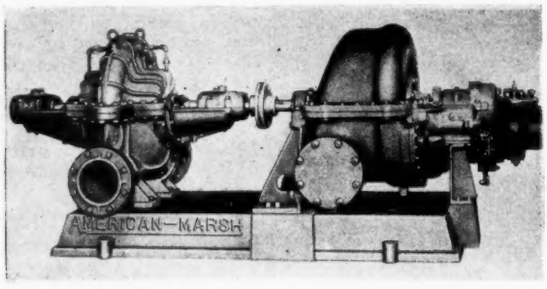
thread. The dies can also be quickly adjusted to cut deep or shallow threads. The new dies are ground with a slightly different cutting angle from the standard dies used for iron pipe. *Oster Manufacturing Company, Cleveland, Ohio. May 8, page 825.*

Cast-Iron Pipe with Dimensions of Wrought-Pipe

A line of cast-iron pipe, made of high quality cast-iron having corrosion resisting properties, is now available. It is made with the same outside diameter as wrought pipe and the standard pipe cutting and threading tools are used. The pipe is useful wherever corrosion is present either due to fluids being handled or to outside soil or immersion conditions. Fittings of the same iron in screwed and flanged patterns are also available. The use of screwed fittings of the usual types makes it possible to work in much closer quarters than has been possible with the conventional types of bell and spigot fittings. The pipe is made in sizes 8-in. and smaller. *Walworth Company, 51 East 42nd St., New York City. Oct. 9, page 612.*

Pumps for Power Plant and Industrial Uses

Recent developments embody refinements in design and improved efficiencies

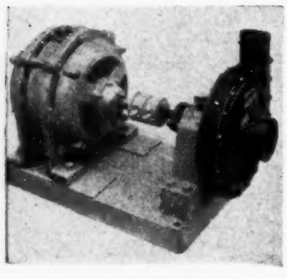


General Service Centrifugal Pumps

This line of single-stage general-service centrifugal pumps, known as type HBM, has been especially designed to give improved efficiencies. The casing of the pump is of the double-suction type and split horizontally, and with suction and discharge nozzles cast integral with the lower half. The impeller is double-suction inclosed type and is hydraulically balanced. It is cast in one piece and machined all over to insure dynamic balance. The shaft, which is of open-hearth steel and of large diameter, is protected through the suction chamber and stuffing boxes by bronze sleeves. Removable bronze wearing rings are provided on both impeller and casing and are designed with ample surface and small clearance to reduce leakage to a minimum. The stuffing boxes are unusually deep and are fitted with bronze lantern seats and swing bolts. The shaft bearings are of the ring-oiling sleeve type. On all sizes, 5-in. and larger, designed for heads of 150 ft. and over a ball thrust bearing is mounted on the outer end of the shaft. *American Steam Pump Co., Battle Creek, Mich. Oct. 2, page 572.*

Hard Rubber Acid-Resisting Pump

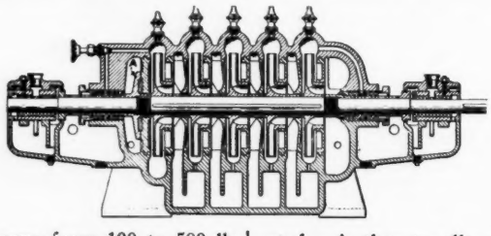
In this line of hard-rubber acid-resisting pumps of the side-suction inclosed-type, the entire pump and impeller with the exception of the shaft, which is of Monel metal, is of hard rubber molded from polished steel dies. With the casing of this material the pump is capable of handling all acids except concentrated sulphuric acid. Five sizes of this pump are manufactured, ranging in capacity from 50 to 300 gal. per min. *Bingham Pump Co., Portland, Ore., July 31, page 207.*



Pumps in Single and Multi-Stages

Made in several sizes, this line of hydraulically balanced multi-stage centrifugal pumps has been designed especially for boiler feeding, city water-works and other heavy-duty high-pressure services. Discharge pressures range from 100 to 500 lb. per sq.in. and capacities from 100 to 500 gal. per min. These pumps are of the single-suction design without diffusion rings, but with a spiral or volute in every stage. One-piece bronze diaphragms are used between the stages. A hydraulic balancing device of the disk type is placed at the outboard end of the pump. Leakage at the high-pressure stuffing box is controlled by a needle valve on the water seals. Bronze packing glands of the split type deflect leakage into the bearing yoke, and grooved sleeves on the shaft return the leakage within the gland and thus prevent the external throwing of water. Cast-iron babbitt-lined ring-oiling bearings carry the shaft, and bronze sleeves extend through the stuffing boxes and protect the pump shaft wherever exposed to the water.

Single-stage pumps embodying several refinements in design are also included in this line. The pumps are designed for standard motor speeds of 1,750 r.p.m. for 100-ft. heads, and 1,750 or 3,600 r.p.m. for heads up to 200-ft. The single-stage pumps are of the double-suction type with horizontal split casings. *Economy Pumping Machinery Co., Chicago, April 24, page 740.*

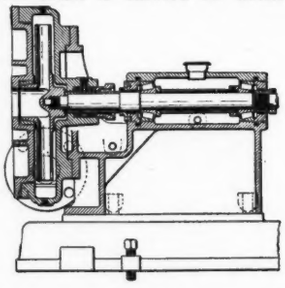


Class C. H. Centrifugal Pump

Designed to meet the demand for a moderately priced high-efficiency unit this class "C.H." pump is of the single-stage single-suction type and is made in a number of sizes with capacities from 10 to 225 gal. per min., with a total head of 100 ft. The impeller is of cast iron and of the open type. The shaft is of high-carbon steel and is carried in two bearings, the one next to the coupling being a ring-oiled one-piece bronze bearing and the one next to the pump casing a long bronze sleeve pressed into the bearing stand and grease lubricated. A thrust collar located in the ring-oiled bearing housing takes care of the end thrust. In the direct-connected unit the pump is connected to the motor by means of a specially designed combined pulley, pin and rubber bushing type coupling. Pumps with bronze or inclosed impeller and Monel metal-shaft are available.—*Buffalo Steam Pump Co., Buffalo, June 12, page 1069.*

Centrifugal Pump for Handling Acids

Designed especially for the chemical industries, this type F centrifugal pump has a heavy-duty impeller with large clearances to prevent clogging. The alloy-steel shaft, which is of liberal diameter, is entirely protected from the liquid handled. The shaft is carried on double

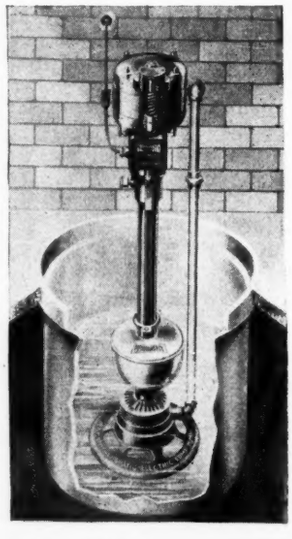


tapered roller bearings, designed to take both radial and thrust loads. Pump casings of cast iron, lead, steel, bronze, Duralloy, Alcumite, and other special metals, are available to suit the different acids handled. *The Lecourtenay Co., Newark, N. J. Oct. 9, page 612.*

Self-Contained Electric Sump Pump

This sump pump is of the self-contained self-supporting type, designed for placing directly on the bottom of a shaft or well without the use of supporting covers to fit the various sizes of wells. The pump is of the balanced open-impeller type and is provided with a large area strainer directly above it.

The motor is fitted with ball bearings and is coupled to the power shaft by a flexible coupling, the shaft itself being supported at the top by a ball bearing. The operation of the pump is controlled by a float operating a simple mercury-type switch through a switch-control arm adjacent to the pump supporting column. An adjustable bronze ring governs the water

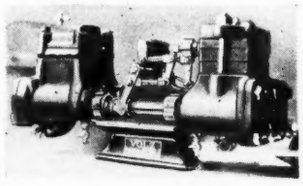


head at which the pump starts.

The pumps are made in $\frac{3}{4}$-in. and 1-in. discharge pipe sizes and for discharge heads up to 20 ft. *The Penberthy Injector Co., Detroit, June 12, page 1069.*

Non-Pulsating Valve Motion for Duplex Pumps

The principle involved in this device is that of overlapping the piston travel at the beginnings and ends of their strokes so that one at full speed or both at half speed are always in motion and each starts on its return immediately without

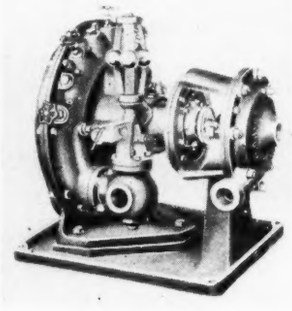


any wait between strokes. The valve motion has two more members on each side than the ordinary duplex motion, namely, a floating lever and link. Each valve rod is connected by linkage to both pistons, so that while the movement of each valve is actuated by both pistons, the opposite piston causes most of the throw and maintains "step."

The total port area open at any one time substantially equals one port fully opened. When one piston is at the end of its stroke the other is traveling at full speed, and when one piston is decreasing in speed the other is increasing, so that the total displacement speed is essentially the same. *Volz Engineering Corporation, Long Beach, Calif. Sept. 18, page 495.*

Close-Coupled Centrifugal Pumps in Single- and Two-Stage Types

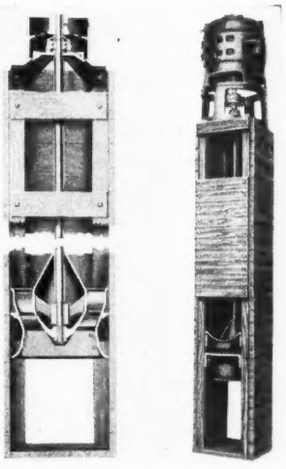
The pumps included in this line, designated as type "CCS" series 6,000, are available in three models: Single-stage motor-driven (illustrated on insert), two-stage motor-driven, and the single-stage turbine-driven. The design of the pump is the same in each case, the impeller being mounted di-



rectly on the end of the motor or turbine shaft and the pump-supporting casing bolted to the motor end bell or to an extension flange on the turbine bearing.

The casing is of semi-steel with the volute passages machined to reduce the friction. The suction and discharge connections are screwed on the 1½-in. size and flanged on the 2-in. size. The impeller is of government bronze with the outside surfaces polished and the inner surfaces filed smooth. A bronze sleeve protects the shaft through the stuffing box, and a splash disk is provided on the shaft to prevent any leakage from the stuffing box entering the motor bearing. This disk also serves as a handwheel to test the free running of the rotating element.

The line is available in two sizes—1½-in., with capacities from 20 to 100 gal. per min., and 2-in., with capacities from 100 to 160 gal. per min. *Aldrich Pump Company, Allentown, Pa. Nov. 13, page 809.*



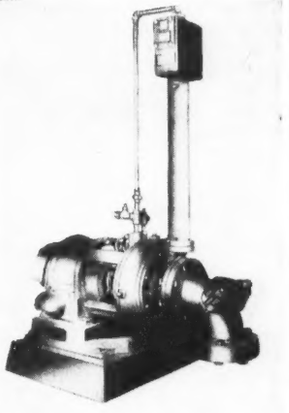
"Everglades" Screw Pump

A type of screw pump known as the "Everglades," designed for handling large volumes of water at low head. The pump is a vertical unit consisting of cast-iron spiders carrying a wood-screw type impeller and diffuser and constructed in such a manner that four wooden corner posts are fastened to the spiders and the structure boarded up so that it may be placed vertically in a trench or stream and arranged to discharge over the top of the levee or embankment.

The pump is well adapted for direct connection to vertical motors, for belt drive from motors or internal-combustion engine using one-quarter twist belt, or by means of a gear box which may be provided at the top of the pump. It may also be direct connected to internal-combustion engines or belted to the gear box, thus eliminating the quarter twist in the belt. *Fairbanks, Morse & Company, Chicago, Ill., Oct. 16, page 649.*

Self-Priming Centrifugal Pump

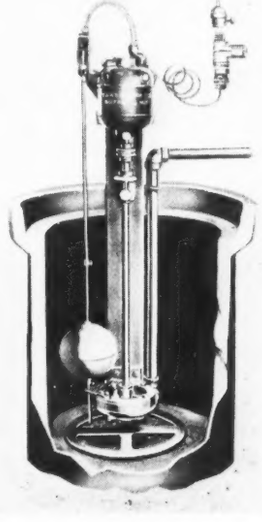
A self-priming centrifugal pump of the single-stage inclosed impeller volute type. In this pump, which is designed to obviate the need for steam or air ejectors for priming, a small built-in vacuum pump is mounted



on an extension of the same shaft that carries the pump impeller and motor armature. When the pump is started, this small air impeller exhausts the air from the pump casing and suction piping, thus priming the pump. *Nash Engineering Company, South Norwalk, Conn. Feb. 28, page 389.*

Taber Midget Sump Pump No. 2

A small capacity sump pump of the self-contained, self-supporting type, designed for placing directly on the bottom of a sump or well without the use of a supporting cover to fit the various sizes of pump

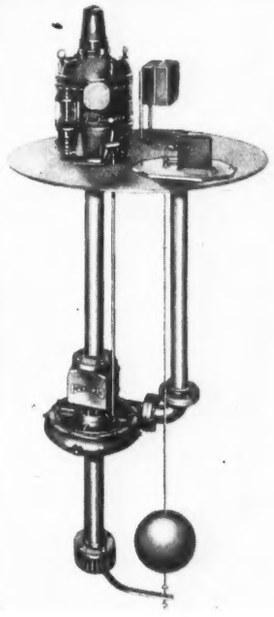


casings. It may also be suspended from the side of an 18-in. tile or tank by means of a bracket.

The pump is driven by a standard ¼-hp. moisture-proof repulsion induction motor connected to the pump shaft through a flexible coupling. It is of the balanced open-impeller type and is built in capacities up to 25 gal. per min. and for a total head of 23 feet. *Taber Pump Company, 288 Elm St., Buffalo, N. Y. July 24, page 162.*

Type M.M.D. Sump Pump

In this sump pump the motor rotor and the rotating element of the pump are carried on one thrust bearing mounted in the upper end of the motor. The motor has a hollow shaft and the pump shaft extends up through it to the top bearing. This construction makes possible a compact unit and obviates the employment of a



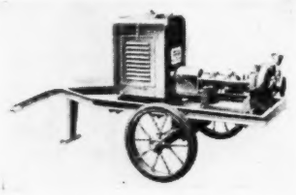
flexible coupling and separate thrust bearing for the pump.

The pump supporting pipe is bolted through to a cast-iron plate which in turn bolts to the motor. With this construction the alignment of the pump and motor is not affected by any distortion of the pit cover. This type M.M.D. pump is assembled complete with float control switch and is available for all standard setting up to 17 ft. in either simple or duplex units. *American Well Works, Aurora, Ill. Dec. 4, page 937.*

Portable Pumping Units of Manganese Steel

A series of portable pumping units, using manganese steel for the shell, impeller and disks. A long, ring-oiling, babbitted-sleeve bearing supports the shaft. The entire unit is solidly

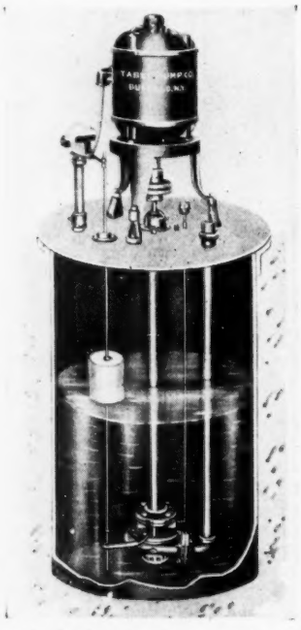
mounted on a baseplate and is connected with a flexible coupling through a friction clutch to a Novo power unit operating at 1,200 r.p.m. These portable pumping units are made with 2-, 2½- and 3-in. discharge, powered by 6-, 8- and 10-hp. engines respectively. The 2-in. unit has a pumping capacity of



100 g.p.m. against a 34-ft. head. The 2½-in. unit has a pumping capacity of 150 g.p.m. against a 34-ft. head, and the 3-in. unit has an approximate capacity of 230 g.p.m. against a 37-ft. head. *American Manganese Steel Company, Chicago, Ill. Sept. 25, page 534.*

Sump Pump in Steel Tank

This pump, which is of larger capacity than the Midget No. 2 made by this company, is designed for a capacity of 100 g.p.m. against a 20-ft. head, or to give 75 and 120 gal. at 23-

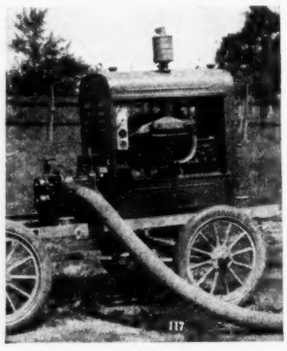


and 14-ft. head respectively. The motor is fitted with ball thrust bearings, and the pump shaft is carried in bronze-bushed bearings, the two shafts being connected by a flexible coupling.

The pump shaft is inclosed, and the pump is supported from the well cover by means of a wrought-iron supporting column. The pump has a bronze impeller and steel shaft. The size of the discharge is 2 in. *Taber Pump Company, 228 Elm St., Buffalo, N. Y. Aug. 7, page 247.*

Portable Engine-Driven Rotary Pump

A self-contained portable pumping unit for industrial and other plants that have no adequate fire-fighting facilities and whose requirements will not justify the purchase of standard pumping installation. The engine is a 4x5-in. four-cylinder unit operating at 1,100 r.p.m. The pump is fitted with a steel alloy shaft, chrome nickel steel pilot gears and hard phosphor-bronze cams that are machined to form, then ground together. The pump shaft is carried on single-row deep-groove ball bearings and is connected to the engine shaft through a flexible coupling. The pump



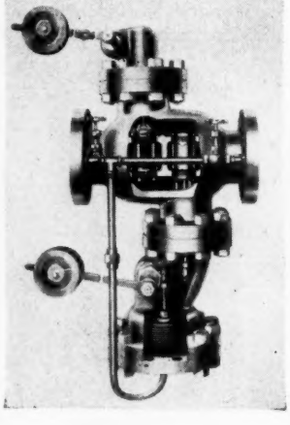
has a 4-in. suction, a 2½ in. discharge and a capacity of 250 gal. at 100 lb. pressure. *Goulds Pumps, Inc., Seneca Falls, N. Y. April 10, page 656.*

Regulators and Controllers

Feed-water regulators for large boilers, improved pump governors, steam and motor-operated controllers with recording mechanism and a desuperheater governor are recent additions to this line of power plant equipment.

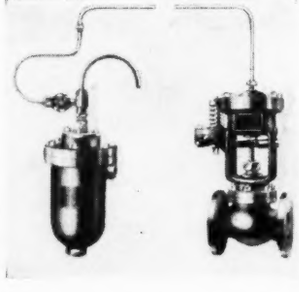
Combined Feed-Water Regulator and Pressure Regulating Valve

In this combined feed-water regulator and pressure regulating valves (Type RG), two valves are placed side by side in a single body casting. One valve is a standard Copes feed-water regulating valve operated by a thermostat, and controls



the amount of water delivered to the boiler according to the requirements of evaporation and water level.

The other valve is operated by a sylphon bellows and is designed to control the water pressure differential and to give a constant excess pressure on the line side of the regulating valve. The initial, or feed-line pressure is on the outside of the bellows, and the discharge or boiler pressure is on the inside; thus the bellows is subjected to the differential water pressure, the differential being determined by the position of the weight on the lever arm. *Northern Equipment Company, Erie, Pa. May 29, page 993.*



"Thermofeed" Feed-Water Regulator

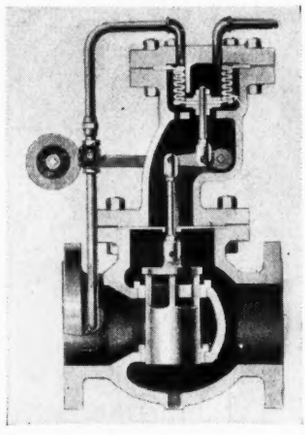
This feed-water regulator, known as the "Thermofeed," operates solely by the water level and has only two main parts—a controlling element and a regulating valve.

A double-ported valve operated by a float in the controlling element admits pressure to the diaphragm chamber of the regulating valve or connects this chamber directly with the atmosphere, this operating causing the regulating valve to open or close in direct relation to the changes in the water level of the boiler.

Provision is made in the design of the float for pressure inside to counteract that on the outside. The float has thermetically sealed within it a small quantity of water, which is converted into steam at the pressure to which the outside temperatures correspond, thus balancing the pressure on the float. Any desired variation in the water level is readily obtained by adjustment of a spring on the regulating valve. *Ronald Trist & Company, Ltd., 56 Victoria St., Westminster, London, S.W. 1, England. Dec. 18, page 1012.*

Differential Water-Pressure Regulating Valve

A differential water-pressure-regulating valve, designated as the Copes type *SS* valve and designed to regulate the excess water pressure across the control valve of a feed-water regulator. The valve is suitable for use in connection with any feed-water regulator and is designed to maintain the desired



pressure drop, regardless of variations in boiler-drum pressure or pump pressure, or friction loss in the feed line to the individual boiler. The main actuating element is a four-ply brass sylphon bellows to which the valve is attached by means of links.

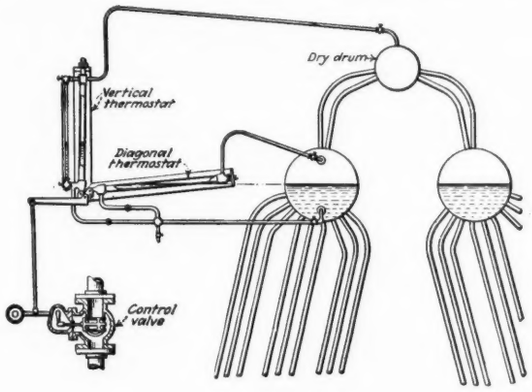
The type *SS* valve is furnished in all sizes with straight-way style body only, in the 250-, 400-, 600-, 900- and 1,350-lb. standards. It can be placed in either horizontal or vertical feed lines. *Northern Equipment Company, Erie, Pa. Dec. 25, page 1055.*

Feed-Water Regulator for Large Boilers

In this regulator, which is designed especially for large boilers operating at high ratings, the regulating valve is controlled by a combination of steam flow and water level movements, and consists of a

double thermostat with two expansion tubes, each of which actuates the same control valve.

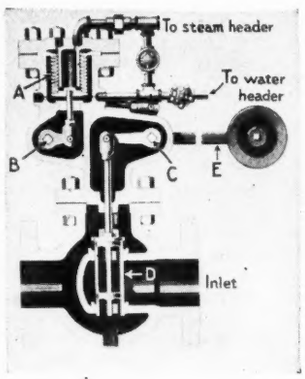
The vertical thermostat is designed to operate normally the control valve, increasing or decreasing the feed, depending on the flow of steam from the



boiler. As the flow of steam increases, the drop in pressure between the main boiler drum and the dry steam drum increases. This causes the water in the vertical thermostat to rise, and as the level in this thermostat becomes higher, the thermostat contracts and opens the control valve, supplying more water to the boiler. As the load decreases the difference in pressure between the main drum and the dry steam drum is lessened. Consequently, the level in the vertical thermostat lowers, and less water is supplied to the boiler. *Northern Equipment Company, Erie, Pa. Jan. 10, page 78.*

Copes Type DS Pump Governor

In addition to its adaptability as a pump governor on any type of reciprocating pump and turbine or motor-driven centrifugal pumps, this type DS governor is suited for differential excess-pressure service for



boiler feeding, constant-pressure service, differential reducing-valve service on motor-driven pumps, and relief-valve service on belt-or gear-driven pumps.

The valve-actuating element of the governor is a brass sylphon bellows designed to withstand an unbalanced pressure of 400 lb. and unaffected by high steam or water temperatures. The inside of the bellows is subjected to the pressure of the main steam headers and the outside to the pressure of the main water headers. A lever connected with the valve carries weights by means of which any changes desired in the differential water pressure can be made by moving the weight along the lever. Any moving part on which stuffing boxes are used has a rotative instead of sliding movement.

The governor is available in all sizes with straight-way or angle style bodies for 250, 400, 600, 900 and 1,350 lb. standards and is suitable for service in either horizontal or vertical lines. *Northern Equipment Company, Erie, Pa. Jan. 8, 1929, page 68.*

Recorder Controller in Single and Double Systems

This controller (illustrated on insert) is furnished in the single or double system, one bulb only being required for each system for controlling and recording the temperature. The thermostatic system of the meter, consisting of the actuating element, bulb and interconnecting tubing, may be either vapor tension, gas filled, mercury, or fully compensated mercury filled.

An important feature of the meter is the addition of a flapper valve by means of which throttling control or "on and off" may be had. The instrument is set for the desired temperature by means of an adjustment knob on the outside of the case. All the gages are on the inside of the case and are visible through glass windows in the front cover. The instrument is equipped with a full-size 10-in. chart, with a pen travel of 4¼-in. *C. J. Tagliabue Manufacturing Company, Brooklyn, N. Y. Jan. 22, 1929, page 145.*

Leslie Class PN Pump Regulator

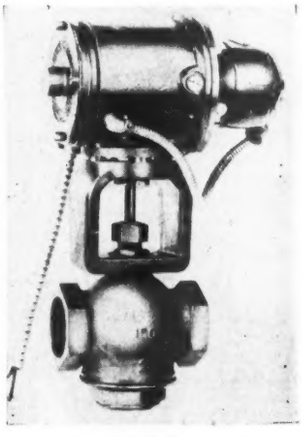
This regulator (illustrated on insert) is designed especially to meet the requirements in steam-turbine-driven and reciprocating pump service. It embodies all the important features of the class P regulator described in the Sept. 11, 1928, issue of *Power*, with a few modifications in design which serve to make the regulator stable under any load condition. One of the important features of the regulator is the elimination of stuffing boxes on any moving part. This is accomplished by the use of the diaphragms clamped between flanges in the valve bonnet and transmitting the movement from one diaphragm to the other by means of exterior crossheads. This construction bends to eliminate all internal friction in the regulator and to make possible a quick and positive action under all pressures and load ranges.

The regulator is designed to maintain pump discharge pressures at any point within the range of 15 to 450 lb. It is all bronze, suitable for 300 lb. working steam pressure and 550 deg. total temperature. The regulator is available in standard pipe sizes from ¼- to 2½-in. inclusive. *Leslie Company, Lyndhurst, N. J. Jan. 22, 1929, page 144.*

Desuperheater Governor

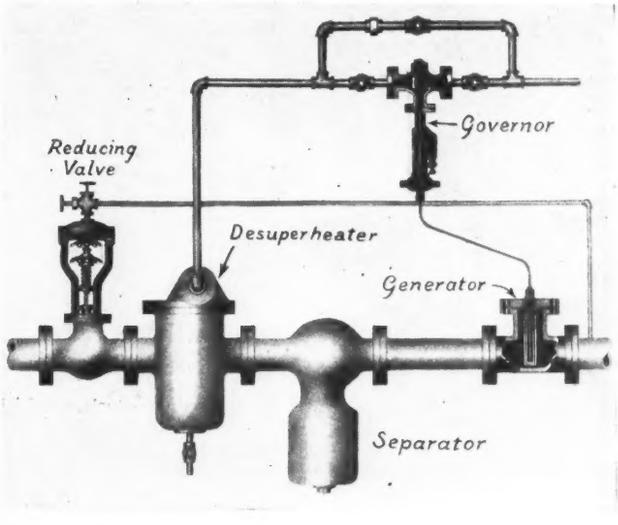
This desuperheater governor is designed to control the temperature of the steam leaving the desuperheater by regulating the supply of water to the desuperheater. It consists of two principal parts, a governing valve and a generator to produce the pressure to operate the valve.

The governing valve is inserted in the water line leading to the desuperheater, and the generator in the steam line leaving the desuperheater. The generator functions to increase or decrease the pressure on the diaphragm of the control valve in direct relation to the temperature of the steam passing through the pipe. Adjustment of the governor to give the desired steam temperature is readily made by changing the tension of the spring in the valve bonnet. The generator well is made to be welded directly into a pipe line or screwed into a flange. The governor is made in pipe sizes from ¼- to 3-in. *Swartwout Company, 18511 Euclid Ave., Cleveland, Ohio. Jan. 15, 1929, page 103.*



Motor-Operated Type "B-K" Control Valve

In this motor-operated valve for steam, water and compressed air, a globe-valve body of standard design is employed,



and the operating unit is supported on a rigid bracket with provision for keeping the high temperatures away from the motor and operating mechanism. The valve is operated by a cam, acting on a follower directly in the line of the stem and tend-

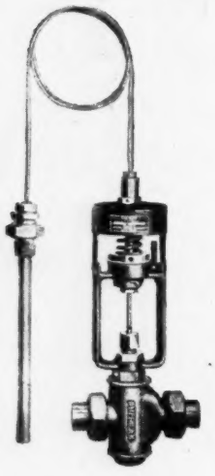
ing to force it to the open position. The speed reduction from the motor to the camshaft is accomplished by spur gears totally inclosed.

The motor is carried on one end of the gear box by a waterproof mounting. A limit switch is mounted in a readily accessible compartment in the end of the gear box remote from the motor. This switch is actuated by a small cam carried on the main camshaft and is thus positively interlocked with the steam valve.

The valve is suitable for installation on steam lines to practically any service where there is required the automatic or remote control of temperature or humidity by means of steam, or in any place where the control of steam, air or water from a remote point is desired. It is available in all sizes from ½- to 2½-in. and for pressures from 150 lb. in the smaller sizes to 75 lb. in the larger sizes. *Bristol Company, Waterbury, Conn. March 27, page 570.*

Automatic Temperature Controller

A self-contained automatic controller in which a flexible bellows of special design and an operating spring of exceptional large diameter are the important parts. The instrument is made in a number of standard temperature ranges and the set-



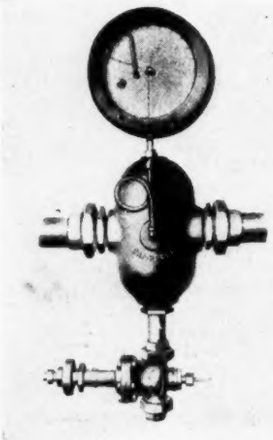
ting point may be adjusted by simply turning a nut which varies the tension of the valve spring. A safety device is provided to guard against damage to the bellows from over-pressure caused by accidental overheating.

The controller is particularly suited for hot-water service tanks, water heaters and other similar services where a simple controller is required for close regulation. *American Schaeffer & Budenberg Corporation, 338 Berry St., Brooklyn, N. Y. Aug. 7, page 247.*

Steam-Flow Controllers

A steam-flow controller made in the single and twin orifice types and adaptable for regulating the flow of steam to gas or oil burners, the distribution and control of steam for drying processes, heating buildings, and, in general, to regulate the steam to any point where an appreciable drop in pressure is permissible. It consists essentially of a combination of receivers, calibrated nozzles or orifices and recording or indicating instruments.

The single orifice type is used



where relatively small flows are desired. It is fitted with a single calibrated nozzle at the discharge of the receiver and with an indicating gage or flow indicator, which shows the flow directly in pounds of steam per hour. For large flows the twin orifice type shown is employed. This unit is fitted with twin calibrated nozzles and is designed to proportion the flow to two points in the ratio of the orifice area. *Campbell Engineering Company, Short Hills, N. J. June 19, page 1116.*

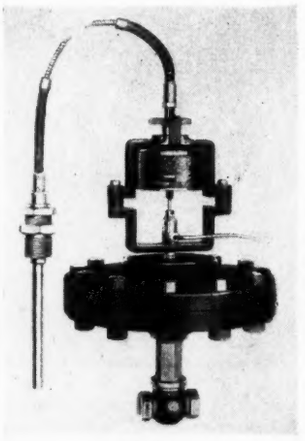
Steam-Operated Controller

A type of controller which utilizes a portion of the steam in the pipe line which it controls to work the valve, the opening and closing of which governs the temperature of the apparatus in which the steam is admitted. The controller has four principal parts—a control valve which is inserted directly in the line, a large diaphragm for operating the valve, a pilot valve, and a thermostatic element.

The pilot valve is operated by metallic bellows, the movement of which is controlled by a thermostat bulb inserted in the tank or vessel to which steam is being admitted. Adjustment of the setting point within the range of the controller is made by means of a knurled nut on the controller head.

The amount of opening through the pilot valve governs at all times the opening through the main valve from cracked to full opening.

The controller is adaptable to a large number of services and is made in the direct-connected

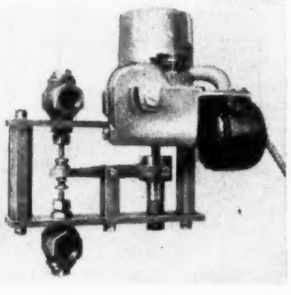


type shown, and the wall type in which the controller head is mounted on the wall at some convenient point remote from the valve. It is designed to operate on pressures between 5 and 100 lb. and for use as temperature controller is furnished with a 40 deg. range anywhere between the limits of 95 and 290 deg. up. The size of the steam valve ranges in standard pipe sizes from ½- to 4-in. *C. J. Tagliabue Manufacturing Company, Brooklyn, N. Y. Jan. 17, page 119.*

Motor-Operated Temperature Control

An automatic temperature controls in which two valves (one for steam and one for water) are operated alternately by a reversible motor.

The motor drives a threaded

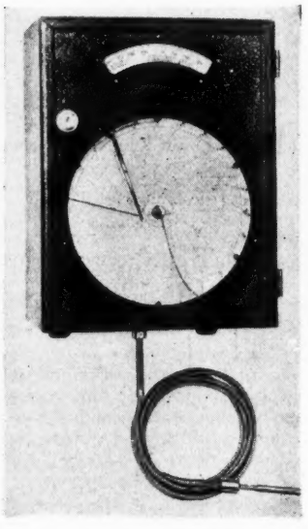


shaft through a double-worm reduction gear mechanism. A lever, connected to the shaft and pivoted in its center, is arranged to operate the valves alternately. The complete control consists of a contact-making thermometer, of either the recording or indicating type, a relay panel and the duplex valve unit. By the use of a special relay the instrument contacts carry only a very small current and do not break an inductive circuit. *St. Louis Motor Valve Company, St. Louis, Mo. Oct. 23, page 689.*

Recorder Controller

The controller illustrated is a single-pen recording system with controller mechanism and scale mounted directly above it. The recording pen and moving contact are each actuated by separate pressure elements which are alike in construction and connected through one capillary tube to the sensitive bulb. The controller is arranged for a contact capacity of 1,000 watts by equipping it with self-contained automatic switches.

Terminals are supplied for making easy connections to line and control apparatus through conduit. To use, it is only necessary to set the control to the desired temperature by moving an index pointer over a



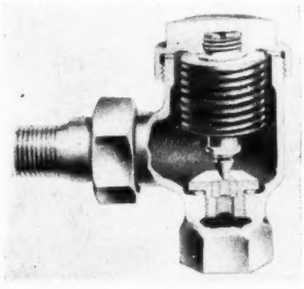
scale to the degree to be controlled. Zero adjusters are provided for both recorder and controller pressure elements. The case is made of sheet steel and is fitted with a glass over the chart and controller scales. The large current-carrying capacity of this controller makes it possible to adapt the instrument to many control applications without the use of the relays, typical application being motor-operated and solenoid controller valves which may be connected directly to the terminal. Also, for electric heating control, mainline switches may be operated without the addition of relays. *Bristol Company, Waterbury, Conn. May 8, page 824.*

Steam Traps

Return traps with steam, air or water pressure operated pilot valves and in which all the operating mechanism with the exception of the float is located on the outside, and traps which positively expel the air at each discharge, are the important additions to this line of power plant equipment.

Bellows Operated Trap for Process Steam

In this process steam trap (type S-75) the operating element consists of a heavy-wall helical bellows with a renewable



monel-metal valve head and seat. The operating element is supported from the cover and is designed to be self-adjusting from 0 to 75 lb. The trap is small and light in weight and is claimed to have unusually large capacity and quick high lift when discharging. The ½-in. trap has a capacity of 400 lb. of water per hour. *Sarco Company, Inc., 183 Madison Ave., New York City. July 24, page 162.*

Curtis Type-T Return Trap

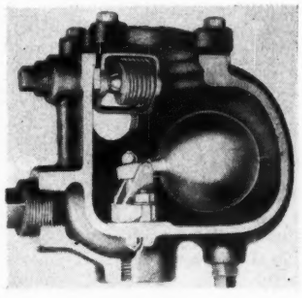
Few moving parts, one-point valve adjustment and packless gland on float shaft are features of this type-T return trap (illustrated on insert). The design embodies a stationary receiver and three valves—a pilot valve, an equalizing valve and a vent valve—all of which are outside of the receiver. The pilot valve is operated directly by the float while the steam or equalizing valve and the vent valve are operated by air or water pressure under control of the pilot valve. The movement of two latter valves is synchronized, so that one is open while the other is closed and vice versa. There is only one valve adjustment on the trap, which alters the travel of the pilot valve in relation to the float.

The trap is made in six sizes numbered 0 to 5, with inlet and outlet connections, steam-valve size and capacity, as a boiler feeder, as follows: No. 0, 1¼-in., ¾-in., ½-in., and 1,080 lb. per hour, and the No. 5, 3-in., 2½-in., 2-in., and 16,800 lb. per hour, respectively.

The trap is equally adaptable to high or low pressures and can be used as a lifting trap for handling gasoline, oil and other liquids. *Julian D'Este Company, Boston, Mass. Nov. 6,* page 774.

Sarco Combined Float and Thermostatic Trap

In this trap (FT-1) a thermostatic valve is used to take care of the air and a float-operated valve to discharge the condensation. The thermostatic element is identical with that used in the



radiator trap manufactured by this company.

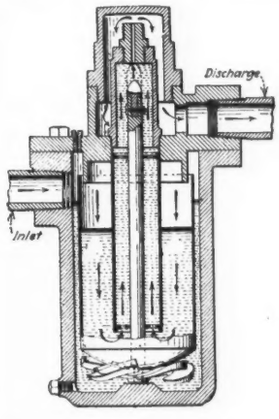
The float-operated valve is of the rocking-bar type with underslung valve head. The body of the trap is of cast iron, and all other parts are of brass or bronze except the holding studs. Two inlets and two discharge connections are provided.

The trap is designed for pressures up to 10 lb., with a differential of 2 lb. pressure the capacity is around 1,000 lb. per hour and with 10 lb. pressure around 2,000 lb. per hour.—*Sarco Company, 183 Madison Ave., New York City. July 17, page 119.*

Trerice Steam Trap

Large capacity with small size and weight are features of this trap. It consists of a bucket, valve spindle with guiding sleeve and valve seat. A small aluminum propeller is attached to the bottom of the bucket to give the bucket and valve spindle a rotating motion as the bucket drops. The valve and seat are of chrome nickel, the seat being reversible.

The trap is made in three sizes: No. 2, with ½- and ¾-in. inlet and outlet connections respectively; No. 3, with 1- and 1¼-in. connections, and No. 4, with 1½- and 2-in. connections,

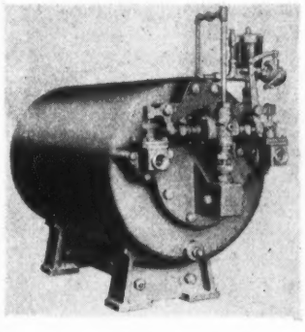


and having capacities around 2,400, 7,800 and 14,400 lb. per hour respectively. *H. O. Trerice Company, 1338 West Lafayette Boulevard, Detroit, Mich. June 19, page 1117.*

Simplified Pumping Trap for Water and Other Liquids

This trap, known as the "Shortt," is designed to function equally well on steam or compressed air and is adapted to a variety of services, including the pumping of high- and low-temperature liquids such as oils, condensates, gasoline, etc., the draining of condensers, receivers and similar equipment and the feeding of boilers. The pressure and vent valves are controlled by means of a small piston valve.

To the head of the stationary



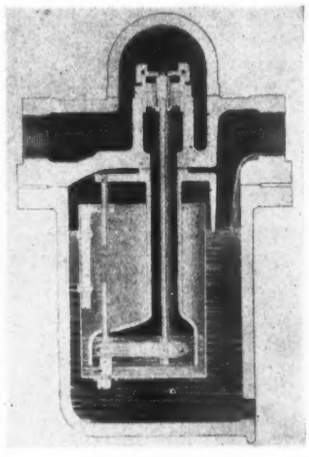
receiver is fastened a plate on which are mounted all the operating valves, there being nothing inside the receiver but the float. When the receiver fills, the float rises, opening the cylinder control valve. This allows steam or compressed air, to flow into the operating cylinder, and causes the piston to move, first closing the exhaust valve and then opening the high-pressure steam valve. The steam or air then flows into the receiver and forces out the liquid. When the liquid has lowered to the sealing level, the operation is reversed.

The trap has large capacity, positive action, and wiredrawing is eliminated through the quick full-opening of the steam valve. *W. B. Connor Company, Inc., 369 Lexington Ave., New York City. April 3, page 613.*

"Airxpel" Bucket Trap

Bearing the trade name "Airxpel" and made in two sizes, designated as "Master" and "Cub," this trap is featured by the method of removing the air without loss of steam. Other features are the accessibility to the valve and seat by removal of the valve cap and the straight-line horizontal pipe connection to the cover. The valves and seats of the trap are reversible and the valve holder has spiral vanes on its side, which rotate the valve during each discharge.

The design of the trap is such as to give a positive air discharge with each discharge



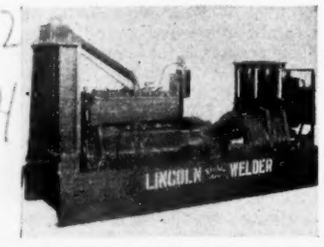
of condensation. As the water fills up in the body of the trap around the bucket, the air is discharged into the center tube. Then as the bucket fills with water, the air is forced up into the tube around the valve and is trapped by the water and carried away with the next discharge. The "Master" traps are made with connections from one-half to two inches. They are made in semi-steel for pressures up to 300 lb. and in cast steel for pressures up to 400 lb. The bucket is of copper, and the valves and seats are of Monel metal, with all other parts of bronze. The "Cub" sizes have connections ½- and ¾-in. and are available for pressures up to 200 lb. *Wright-Austin Company, 315 Woodbridge St., Detroit, Mich. Jan. 24, page 160.*

Welding Machines and Accessories

The variety of new and improved arc-welding machines, welding and cutting torches, electrodes, acetylene generators and welding accessories demonstrates the increasing importance of welding in the construction and repair of power equipment.

Model S-1964 Electric Welder

This gasoline-engine-driven welding unit, which is known as Model S-1964, is rated at 300 amp. and has a current range of from 75 to 400 amp. for metallic electrode welding. The generator is direct-connected to a six-cylinder Buda Model HS-6



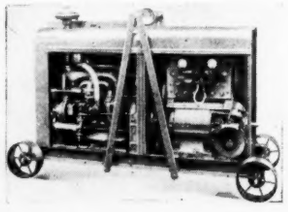
engine operating at 1,500 r.p.m., both units being mounted on a welded steel base. The gas tank is in the channel-iron frame under the engine, thus eliminating fire hazard.

The generator has a laminated magnetic circuit with separately excited field, stabilizer, variable voltage and steel construction features. The over-all dimensions are 93 in. long, 35 in. wide, with an over-all height of 45 in. *Lincoln Electric Company, Cleveland, Ohio. July 10, page 75.*

"Dualarc" Direct-Current Welder

An important feature of this welder is its adaptability to other services in addition to welding. The generator is equipped with collector rings, which produces an alternating-current supply for the operation of electric drills, lights and grinders. This current can also be used for nickel spotting and is especially convenient in case of night welding or welding where electric current is not available.

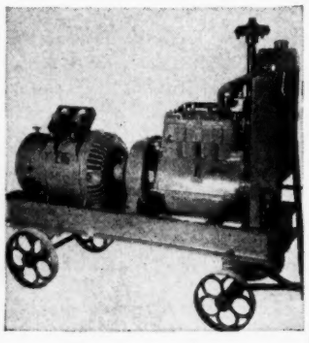
The series field of the generator is compounded so as to give a reserve voltage. Independent control of the voltage and amperage is provided, making it possible to obtain practically any welding heat desired, and make the welder adaptable to a wide range of welding applications. The generator is self-exciting and is so designed that the series field cannot reverse or overbalance the shunt field. Also, the generator cannot be overloaded as the voltage falls to a low value. The unit



is equipped with a spring-reactor-type stabilizer connected in series with a welding circuit. The generator is ball bearing throughout and provided with a shaft extension which can be used as a power for air compressor or other service. The generator is driven by a model B-20 four-cylinder Continental engine. The units are made in 150-, 200-, 300- and 400-amp. ratings. *Electric Arc Cutting & Welding Company, Detroit, Mich. July 3, page 33.*

Fuzon Arc Welders for Stationary and Portable Service

In this complete line of electric arc welders in the motor and gasoline-engine-driven types for both portable and stationary

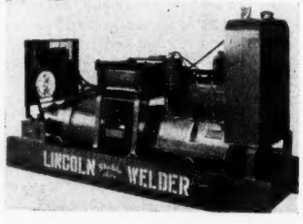


service the welding generators are self-contained, in that all rheostats, switches and external stabilizers are eliminated. The excitation current is taken from the main brushes, and the current output of the generator can be set at any desired amperage by simply shifting the brush. The stability of the arc, or the elimination of the external stabilizers, is accomplished by a special disposition of the commutating pole windings. A short extension arm from the brush-holder rocker arm fastens to the frame of the machine, and the attached pointer reads in amperes on the index plate.

The important advantage claimed for this single-brush shifting-current control is that it tends to give a uniform arc over the entire range of output. This line of welders also includes 200- and 300-amp. machines fitted with wire wheels and pneumatic tires. *Fusion Welding Corporation, 103rd St., Chicago, Ill. Sept. 4, page 419.*

Self-Contained Light-Weight Welder

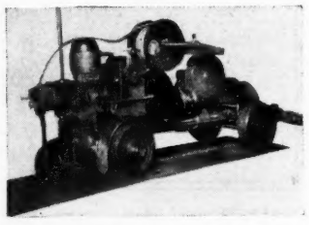
In this welder, which is especially adapted to welding structural work, pipe-line construction and similar work, the welding generator and engine are mounted on a structural base welded into a solid piece. This construction provides maximum rigidity with minimum weight, the whole unit weighing only 1,580 lb. The unit has a rating of 200 amp. with a current range of from 50 to 300 amp., and a speed of 1,500 r.p.m. The engine is a four-cylinder Continental Red Seal type H9.



The complete magnetic circuit of the generator is a laminated steel structure which, it is claimed, tends to increase the stability of the arc. A steel switchboard is provided in place of the usual composition board, thus reducing the possibility of damage or interruption in the field. The unit is 76 in. long by 25 in. wide. *Lincoln Electric Company, Cleveland, Ohio. May 1, page 781.*

Automatic Tractor Type Welder

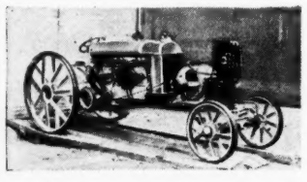
High welding speeds and smooth uniform welds are claimed for this automatic tractor-type arc welder utilizing the electronic tornado principle and used for making lap and butt welds on large tank bottoms, roofs, large pipe and similar work. The machine consists of an electronic tornado head mounted on a self-propelled four-wheel-drive carriage. Power is supplied through a flexible cable, and all that is necessary is to line up the machine over the seam to be welded and to start the arc. Speeds on ¼-in. lap



joints varying from 50 to 75 ft. per hour are possible. *Lincoln Electric Company, Cleveland, Ohio. Oct. 16, page 650.*

Electric Welder Mounted on Standard Tractor

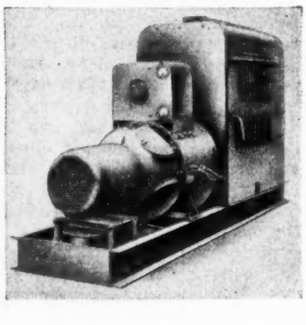
This welder unit, with stabilizer and panel, are mounted on a frame which attaches to a standard tractor. This mounting gives a four-wheel rubber-tire unit not only self-propelled, but capable of hauling loads as well. The unit is also mounted on



crawlers for soft-ground work. Power is taken from the tractor to drive the welder through the power takeoff pulley, which has a clutch allowing it to be thrown in or out of gear at will. This welder is suitable for various kinds of welding around the large industrial plant as well as for pipe-line construction and structural-steel fabricating. *Pontiac Tractor Company, 2842 W. Grand Boulevard, Pontiac, Mich. July 17, page 119.*

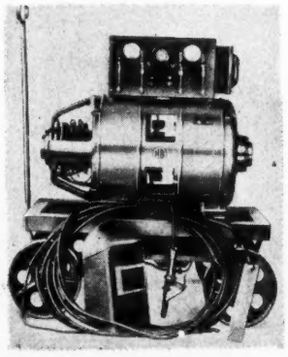
Motor and Gas-Engine-Driven Arc Welders

This line of welders includes stationary and portable direct-current motor and gas-engine



driven machines. The portable type, which may be driven by either a 230- or 550-volt direct-current motor, is suited to applications where only direct current is available. The stationary model is a four-cylinder Continental engine direct connected to a 200-ampere generator. The welding range of each unit is 60 to 300 amperes. The generator is a single-operator, constant-current, differentially compound-wound type, and is separately excited from the line.

In the engine-driven set the engine and generator, complete, with all controls, are mounted on a channel-iron base. The engine is rated at 24 b.hp. at 1,450 r.p.m. *Westinghosue Electric & Manufacturing Company, East Pittsburgh, Pa. Nov. 6, page 773.*



Constant Arc Portable Electric Welders

An important feature of this line of welders, which is made in two sizes, No. 45 and No. 46, with capacities of 10 and 15 hp. respectively, is its compact unit-type construction. Motor and generator are built together as a single unit. The generator is of the potential single commutating type and is self-exciting. The motor can be furnished for two- or three-phase operation on either standard or odd voltages and cycles. Diverter-type windings in the generator perform the combined function of voltage regulator and interpole winding to produce sparkless commutation. The small machine has a current capacity of 175 amp. and the large one a capacity of 300 amp. *Hobart Brothers Company, Troy, Ohio. June 19, page 1115.*

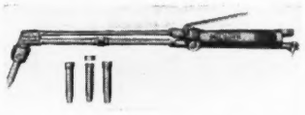
Improved Cutting Blowpipe

An important claim made for this cutting blowpipe, known as type C-14, is that it will not backfire even under the most severe operating conditions. The three gas tubes are straight, having no bends either outside or inside the handle. The small needle-valve bodies are pressure forgings instead of castings, giving better appearance, increased durability and lessened weight. Interchangeable nozzles are provided so that the blowpipe may be used with either medium or low-pressure acetylene. Although the medium-

pressure nozzle cannot be used with low-pressure acetylene, the low-pressure nozzle can be used with a medium-pressure acetylene supply if low pressure is maintained in the hose and blowpipe. *Oxweld Acetylene Company, 30 East 42nd St., New York City. Feb. 28, page 398.*

Welding Torch with Adjustable Tip

In this torch, known as type T1, the change from a cutting to a welding torch is readily made by merely turning the tip. With the tip in one position the gases are passed through the preheating gas passages, while the high-pressure oxygen is car-



ried through the center hole for cutting. In the other position, made by a quarter-turn of the tip, the cutting oxygen is cut off and the welding gases are conveyed to the central passage of the cutting tip, giving a welding flame. The torch head, valves, base and other parts are of bronze forgings, and the seamless high-pressure tube is especially drawn with triple-thick walls. *Alexander Milburn Company, Baltimore, Md. June 12, page 1070.*

Lightweight Combination Cutting and Welding Torch

This torch is designed to operate with oxygen and acetylene, oxygen and hydrogen or other gases, and is readily converted from a cutting to a welding torch by changing the tips. One of the claims made for it is that

it will weld the lightest or heaviest metals and will cut metals up to twelve inches in thickness. The torch has two gas tubes of stainless steel. The torch head, made of forged bronze, as well as the valves, is designed for severe service and continuous operation. The high-pressure cutting, oxygen thumb button remains fixed in either open or closed position without sustained pressure from the thumb. All valves are readily accessible. The weight of the torch is 40 ounces. *Alexander Milburn Company, 1416 West Baltimore St., Baltimore, Md. Jan. 24, page 159.*

Medium-Pressure-Type Acetylene Generators

The type MP-2 generator is built in two sizes having 50 and 100 lb. carbide capacity respectively and replaces an earlier model. The type MP-3 has a 300 lb. carbide capacity. These generators are suitable for supplying pressure-type or medium-pressure welding and cutting blowpipes.

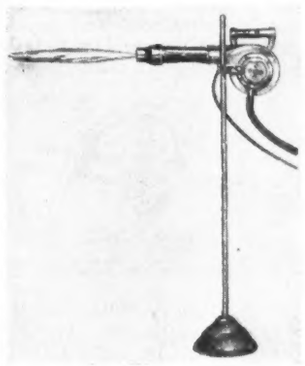
The type MP-2 generators use 1¼x½-in. carbide. Shipping

weight in the 100-lb size is 1,100 lb. and in the 50-lb. size 925 lb. The former has a diameter of 3 ft. 5 in. and the latter 3 ft. 1 inch.

The MP-3 generator uses 1¼x⅜-in. carbide, the over-all height is slightly over 120 in., and the height to the top of the generator shell is 104 in. The diameter of the shell is 42½ in. and the shipping weight 2,300 lb. *Oxweld Acetylene Company, 30 East 42nd St., New York City. Oct. 16, page 649.*

Portable Blow-Torch

This motor-driven blow-torch is designed to give a temperature of 1,600 to 2,300 deg. F. and is especially adapted to operation of welding, brazing, annealing and soldering. It is connected directly to the city gas line, and by means of a special air valve control to regulate the flow of gas and air for the temperature desired, an even flow of gas is maintained, regardless of the pressure on the gas main. The air valve is so constructed that all air can be shut off, making it possible to maintain a low temperature



when desired. *Clements Manufacturing Company, 601-603 Fulton St., Chicago, Ill. April 24, page 741.*

Low-Pressure Acetylene Generator

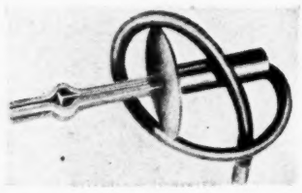
Three sizes of Carbic low-pressure acetylene generators are available. These are known as types B, K and X, which will generate 45, 80 and 30 cu.ft. of acetylene per hour, respectively, at a pressure of less than one pound. Type B is of ample capacity for any cutting operation and any but the heaviest welding and heating jobs. Type K will handle any job possible

with one torch, and type X will weld metal up to ⅜ in. in thickness and cut iron and steel up to approximately 2 in. in thickness.

The height and diameter of the types B, K and X are 54x14 in., 58x26½ in. and 39x14 in., respectively. The weights, fully charged, are 210, 694 and 124 lb. The time that the gas is available for full charge at full capacity of generation is 2, 3 and 1⅓ hours respectively. *Oxweld Acetylene Company, 30 East 42nd St., New York. Sept. 11, page 456.*

Electrode Holder for Metallic Arc Welding

The act of inserting the electrode in this Model A holder automatically scrapes off any insulating material that may be present on the welding rod, insuring four clean points of con-



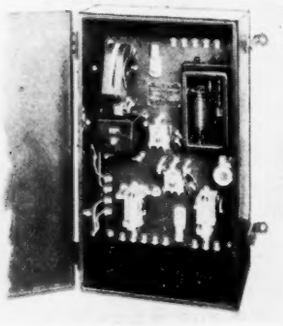
tact and thereby minimizing the overheating of the electrode. The holder is comparatively simple, having no springs or moving parts. The jaws are made of a special copper alloy which resists arcing and to which spattered drops of electrode metal will not stick. The act of inserting a fresh electrode automatically ejects the stub end of the old electrode without the welder touching it. *Fusion Welding Corporation, 103d St. and Torrence Ave., Chicago, Ill. Oct. 23, page 690.*

New Electrode for High-Speed Welding

A welding electrode known as "Fleet-Weld," designed to produce a dense weld of greater ductility and to increase welding speeds is now available. The new electrode, due in part to the higher speed of travel obtainable and in part inherent in the composition of the rod, gives a smoother finish to the head and a deeper penetration than has been possible heretofore. *Lincoln Electric Company, Cleveland, Ohio. Dec. 4, page 938.*

Control for Automatic Arc Welding Eliminates Arc Crater

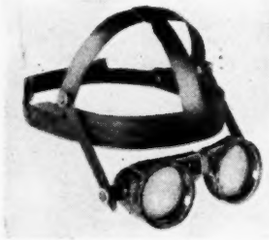
The control panel illustrated is controlled by a start-stop push-button station. Mounted on



the panel are a line contactor of suitable size for the welding current, an arc voltage regulating relay, and relays for controlling the travel motor and for clearing the electrode from the weld. The rheostats for controlling the arc voltage and the speed of the electrode motor are mounted on the outside of the sheet-metal inclosing case. A small meter panel is used for indicating the arc voltage and welding current. *General Electric Company, Schenectady, N. Y. July 3, page 32.*

Helmet Goggles for Cutting and Welding

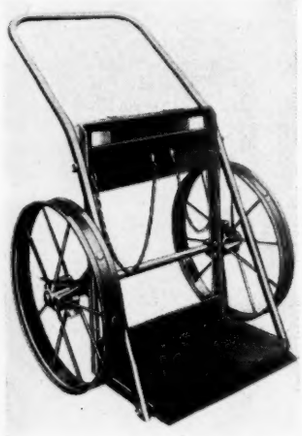
The No. 9 cap-type helmet with goggles consists of a strong fiber cap to which a pair of goggles are attached by means of fiber links so that they can be readily raised over the forehead or lowered over the eyes with one hand. The No. 10



skeleton-type goggles are the same except that the goggles are attached to a lattice skeleton cap. Both styles are provided with leather straps at the rear for head-size adjustment. *Oxweld Acetylene Company, 30 East 42nd St., New York City. December 11, page 981.*

Truck for Oxyacetylene Equipment

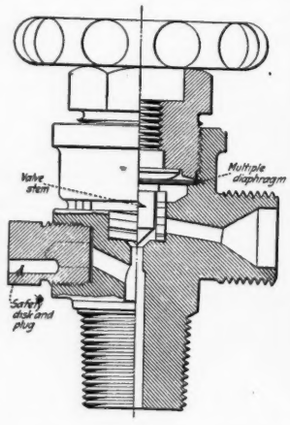
This truck for oxacetylene welding and cutting equipment is equipped with 24-in. steel



wheels. The handle is continuous, and the upper portion is bent back about eight inches, so that the truck can be more easily handled. The tool box is large and is provided with a cover and a holder for extra blowpipe tips. Where 24-in. wheels are not required, 14-in. wheels may be used instead, by changing the position of the axle to a lower set of holes in the frame. *Oxweld Acetylene Company, 30 East 42nd Street, New York City. Feb. 28, page 398.*

Packless Valve for Compressed Gases

A packless valve for use with compressed gases, such as oxygen, hydrogen, nitrogen and air in which the usual packing is replaced by a multiple diaphragm held between a shoulder in the body and the valve bonnet. A



short valve stem is attached to the lower side of the diaphragm and a screwed stem is made to press down on the top. A frangible disk backed by fusible metal which will metal at 212 deg. F. and release at 2,600 to 2,800 lb. pressure, provides a safety feature. The valve is available in the ¾-in. pipe size. *International Oxygen Company, Newark, N. J. Nov. 13, page 811.*

Blowpipe for Use with Small Acetylene Gas Tanks

An outfit consisting of a light blowpipe handle and a set of special tips designed for use with a small gas tank and to give flames suitable for a wide range of work. Soldering may be done either with one of the tips, or the blowpipe may be

converted into a soldering iron by slipping the soldering copper over the end of the blow-torch tip and tightening a single set-screw. It can be maintained at the right temperature by the internal flame. This torch is particularly adapted to soldering and brazing where a low flame temperature can be used to advantage. *Prest-O-Lite Company, Inc., 30 East 42nd St., New York City. March 20, page 529.*

Midwest Power Conference and Show

Power problems and power equipment will attract thousands of engineers to Chicago for the week ending February 16. Power of February 26 will summarize the technical sessions of the Fourth Midwest Power Conference and bring the atmosphere of the great Chicago Power show to the distant reader.

Events and Men in Power's Field

THE EDITORS WILL WELCOME THE CO-OPERATION OF READERS IN REPORTING INTERESTING HAPPENINGS, PERSONAL OR OTHERWISE

Chicago Power Show Will Give a Cross Section of the Power Field

Windy City Coliseum to House the Latest in All Types of Power Devices

With approximately 300 manufacturing companies listed among the exhibitors, a wide diversity of power machinery and power appliances will be on display at the Fourth Midwestern Engineering and Power Exposition to be held in the Coliseum at Chicago, Feb. 12 to 16. Last minute preparations are being made in all sections of the country to attend the show.

Changes of vast importance are taking place in the power field; new machines, new appliances and new methods have been developed. Their significance will be disclosed here. Prominent among the many exhibits listed are power plant equipment, heating, refrigerating and ventilating equipment, power transmission machinery, electrical machinery and appliances, motors, devices for handling materials, and metal working equipment.

The Exposition will be a bee-hive of activity, with some of the machines actually performing their tasks as they would in the field of active service. If it is boilers one is interested in, here will be found a large variety for comparison. Or if it's electric motors, there will be dozens of them. Here will be seen automatic super-stokers, steam traps, heaters, ventilators, refrigerators, super-heaters, soot blowers, valves and pumps of every kind, gas producers, switches, gauges, tools of all sorts, and, in fact, whatever else the engineer may wish to see and learn about in the power plant field.

The diversity of exhibits may best be judged from the names of some of the exhibitors, which include the Bethlehem Steel Company, Commonwealth Edison Company, Combustion Engineering Corporation, Cutler-Hammer Manufacturing Company, The Carborundum Company, American Pulverizer Company, Auburn Stoker Corporation, Air Preheater Company, American Blower Company, Chicago Belting Company, Johns-Manville Corporation, Ingersoll Rand Company, Dust Recovery Company, Republic Flow Meter Company, Lovejoy Tool Works, Detroit Edison Company, Buffalo Steam Pump Company, Young Radiator Company, Shell Petroleum Company, Timken Roller Bearing Company, Westinghouse Electric and Manufacturing Company, Standard Oil Company, and the Nash Engineering Company.

A line of belt lacers, cutters, clippers and fasteners will be seen at the Clipper Belt Lacer Company booth; the Barco Manufacturing Company booths will have a variety of ball and swivel joints, lubricated plug valves and working models of the platen press joints; new air conditioning equipment will be seen at the Bentz Engineering Company booth; air filters for all purposes will be shown by the National Air Filter Company; a wide range of roller bearings will be seen at the Timken and the Norma-Hoffman Bearings Corporation stands; along with the usual line of steam traps, liquid level controllers and other equipment, including pilot-operated pressure-reducing valves, relief or back-pressure valves and boiler gas fuel governors. Running exhibits of several new designs of variable speed transmissions will be shown by the Reeves Pulley Company; the Alexander Brothers booth will be almost entirely devoted to the exhibition of their tentacular belt; devices for removing dirt and moisture from steam and electro-forged steel gratings and open flooring will be seen at the Blaw-Knox Company booth; a dust trap and other equipment will be shown by the Green Fuel Economizer Company.

From the Coliseum the engineers may go to the Palmer House and hear leaders of the industry discuss problems of importance at the Fourth Midwest Engineering Conference. Here will be heard such men as Professor A. E. White, of the University of Michigan, Professor G. L. Clark of the University of Illinois, Professor A. C. Willard also of the University of Illinois, Professor A. F. Scherzer of the University of Michigan, Dr. C. M. Stine of the Du-Pont Company, C. E. Stewart of the General Electric Company, K. H. Logan of the United States Bureau of Standards, R. C. Allen of the Westinghouse Electric and Manufacturing Company, A. J. Authenreith of the Middle West Utilities Company, Prof. C. F. Hirshfeld, Detroit Edison Company, W. D. Sims of the Commonwealth Edison Company and others of similar rating in the power world.

Dr. Walter Dill Scott, president of Northwestern University, will be the principal speaker at the banquet to be held in the Palmer House, Tuesday evening, Feb. 14.

*Spot * News*

THE SCHOELLKOPF STATION *at Niagara Falls reports 101,871 visitors during 1928. All sorts of people, from honeymooners to foreign diplomats, were among the number. It is not reported that any of them were presented with keys to the plant, however.*

* * *

SEVERAL ENTHUSIASTS *from the Public Ownership League of America, addressed a gathering of plant engineers and others interested at Macon, Mo., on Jan. 16. An association to further municipal ownership of power plants is being organized in that territory.*

* * *

GERMANY, *losing her most valuable coal mines after the War, is now using brown coal, or lignite, to manufacture gas and coke. Motor oils and fuel are also produced from the same coal.*

* * *

SEVENTEEN MILLION DOLLARS *is the 1929 budget figure for the Alabama Power Company. The two big jobs on hand are the completion of the Gorgas steam plant with its initial installation of 60,000 kw., and the reconstruction of the lower Talahassee development which will bring in 84,000 hydro-electric horsepower in 1930.*

* * *

THOMAS C. McBRIDE, *engineer of the Worthington Pump & Machinery Corporation, Philadelphia, was awarded the John Scott medal by the Franklin Institute, for his invention of the locomotive feed-water heater. In addition to the medal a certificate and a premium of $1,000 were presented to him.*

* * *

THE INEVITABLE SCOTCH STORY *has got into the power field at last. A Highlander living in Buffalo, N. Y., kicked because the power company moved a street lamp away from the front of his house. He said he had had to give up reading his newspaper at night because the lamp no longer shone into his window.*

Hydro-Electric Plant Problems Discussed by Civil Engineers

Ice Prevention and Pumped Water Plants Occupy Session

FROM Jan. 16 to 18 inclusive the American Society of Civil Engineers held its seventy-sixth annual meeting in the Engineering Societies Building, New York City. At the Power division meeting, ice as affecting power plant operation, and the Rocky River power development, were the subjects discussed.

Prof. Howard T. Barnes told of the different kinds of ice and how they are formed, and suggested methods preventing that formation. By the use of lantern slides Professor Barnes showed the nature of ice structures and told of some of the experimental work he is doing. In applying heat to prevent ice formation, these experiments indicate that the most effective artificial means is radiant energy, such as that obtained from large incandescent lamps. Experiments are now in progress to keep a small hydro-electric plant free of ice by this method.

A paper by W. T. Walker, read by George A. Orrok, told of some of the work that had been done to prevent ice formation in the circulating-water intakes of steam plants on the Northern States Power Company's system in Minneapolis, Minn. Several methods have been tried, but the most satisfactory and economical one is to return part of the circulating water, after it has passed through the condenser, to the intake.

Joel D. Justin discussed the economic features of the Rocky River development of the Connecticut Light & Power Company. The chief feature of interest in this plant is that part of the water for its operation is pumped. The plant contains one 33,000-hp. vertical-shaft generating unit and two 8,000-hp. pumps designed to operate under a maximum head of 240 ft. Provisions have been made for installing a second generating unit.

In Europe plants of this type have been used extensively. One of these plants has two ponds; one forms the forebay and the other the tailrace. During off-peak periods water is pumped from the tailrace into the forebay and in the peak-load hours it is used to operate the generating units. The only outside water required for plants of this type is the small amount necessary to make up losses due to evaporation, seepage and other causes. Such plants operate on the system as storage batteries and were designated by Mr. Justin as the dry-type hydro-electric stations.

Another type of pumped storage plant is partly operated on pumped water, as with the Rocky River project. The storage reservoir for this development is on Rocky River, a small tributary of the Housatonic. The former stream has a drainage area of 40 square miles and the latter 1,037 square miles. A large part of the stored water is pumped from the Housatonic River during off-peak and high-water periods, using power generated in other plants on the system.

When discussing this paper, George A. Orrok and W. W. K. Freeman devoted a large part of their remarks to the use of the pumped-storage plants in Europe. Mr. Freeman called attention to this type of plant being in use in Europe for 46 years and suggested that from a study of the conditions for which these plants have been built abroad, we might learn what situations are likely to provide economical settings for such plants here.

As to future plants of this type, Mr. Freeman told of a 600,000-kw. project with a 28 billion cubic-foot reservoir that had been seriously proposed in Germany, and said that we may expect in time to have such plants built here, for projects with 40 and 60 billion cubic-foot reservoirs are already being considered by our seers and prophets.

George A. Orrok saw the high cost of real estate and water rights as a handicap to pumped-storage developments in this country.

The use of the name "pumped-storage hydro-electric plant" was questioned by L. F. Harza, who suggested in its stead the designation "hydro-regenerating plant" as better expressing the type of water-power plant that operates on pumped water.

William M. White said he was speaking on behalf of the pump. It was his opinion that, even though the efficiency of the pump is now less than that of the waterwheel, the former could be raised to equal the latter.

Men In the News

ELY C. HUTCHINSON, president and general manager of the Pelton Water Wheel Company, of San Francisco, and well known throughout the West as a leading authority on hydraulic power development, has resigned and, beginning Feb. 1, will take charge of the engineering department of the M. W. Kellogg Company, of New York City, with headquarters at Jersey City, N. J.

Coming Conventions

American Boiler Manufacturers Association, mid winter meeting, Cleveland, Ohio, Feb. 5, 1929. A. C. Baker, secretary, 801 Rockefeller Bldg., Cleveland, Ohio.

American Institute of Electrical Engineers, annual winter convention, New York City, Jan. 28-Feb. 1; annual summer convention, Swampscott, Mass., June 24-28; F. L. Hutchinson, secretary, 33 West 39th St., New York City.

American Institute of Refrigeration, at Washington, May, 1929. Louis Laron, secretary, 203 West 13th St., New York City.

American Oil Burner Association, annual convention, Hotel Pennsylvania New York City, April 9-11, 1929. For information, address the headquarters of the Association at 420 Madison Ave., New York City.

American Society of Heating and Ventilating Engineers, 35th annual meeting, Chicago, Ill., Jan. 28-31, 1929. A. V. Hutchinson, secretary, 29 West 39th St., New York City.

American Society of Mechanical Engineers, spring meeting, Salt Lake City, Utah, July 1-4, 1929. Spring meeting, Rochester, N. Y., week of May 13. Calvin Rice, secretary, 29 West 39th St., New York City.

Association of Iron and Steel Electrical Engineers, 25th annual convention, Pittsburgh, Pa., June 17-22, 1929. A. A. Stewart, secretary, Pittsburgh Steel Co., Monnessen, Pa.

Canadian Electrical Association, annual convention, to be held June 19-21, at St. Andrew-by-the-Sea, N. B. H. M. Lyster, secretary, Power Building, Montreal, Que.

Engineering Institute of Canada, annual general and professional meeting, at Hamilton, Ont., Feb. 13-15, 1929. R. J. Durley, secretary, 2050 Mansfield St., Montreal, Que.

Master Boiler Makers Association, at Atlanta, Ga., May 21-24. H. D. Vought, secretary, 26 Cortlandt St., New York City.

Midwest Power Conference and Exhibition, at Chicago, Feb. 12-16; Conference headquarters at the Palmer House, Exhibition at the Coliseum; G. E. Pfisterer, secretary, 53 West Jackson Blvd., Chicago.

National Marine Engineers Beneficial Association. The 54th annual meeting will be held in Washington, D. C., Feb 11-16, at the Hotel Hamilton.

World Engineering Conference, Tokyo, Japan, October, 1929. All correspondence should be addressed to the Secretary, World Engineering Conference, Nikon, Kogyo Club, Morunouchi, Tokyo.

Million Kilowatt Plant is Projected in New Jersey

A definite step toward the erection of one of the world's largest electric power stations has just been taken by the Public Service Electric and Gas Company, subsidiary of the Public Service Corporation of New Jersey, with the purchase of about 125 acres of land on Arthur Kill, just north of Sewaren, N. J. The ultimate capacity of the new station will be 1,000,000 kilowatts. Although preliminary surveys and subsoil studies are now being made, it will probably be several years before actual construction will begin.

The new station is planned in view of the expected growth of the territory in which the company operates. Power from the proposed Sewaren station will not only feed the rapidly growing industrial section of Central New Jersey, but the station will constitute one more power source, feeding into the Public Service Company's so-called "inner ring." This ring at present, through a series of transmission lines, receives power from major stations at Kearny, Essex and Marion. It will also tie in with the interconnected systems of Public Service, Philadelphia Electric and the Pennsylvania Power and Light Company. Thus the territory served by the three companies has available electric energy from one of the largest power pools in the world.

New Power Development on Roanoke River

The Virginia-Carolina Power Company will argue before the state corporation commission on Feb. 7, the first application to develop the state's water-power resources, under the act of 1928, when it presents its case for the construction of a new power plant at Boyd's Mill, on the Roanoke River, in Mecklenburg County. The Virginia-Carolina Company now has a large water-power development at Boyd's Mill, consisting of a wing dam at the head of the rapids, a forebay and a 1,500-ft. canal.

The new plans call for the construction of a dam below the present one that will give a 25-ft. head of water and back the stream up approximately fifteen miles. Generating equipment of 30,000 hp. is to be installed.

The reservoir for the project will have a surface area of 3,000 acres, and at 5 ft. draft the storage available will be approximately 350,000,000 cu.ft. The plant will also have the use of storage at the Bugg's Island development of the Roanoke River Power Company, with an estimated capacity of 5,000,000,000 cu.ft.

The present development of the company was acquired in 1923, having been originally constructed in 1837 by a William Hendrick. It is said to be an unusually fine site for a power generating plant. A grist mill, large sawmill and a short-line railroad are operated by the present plant.

General Electric Orders Up 13 Per Cent in 1928

Orders received by the General Electric Company during the year 1928 amounted to $348,848,512, compared with $309,784,623 for 1927, an increase of 13 per cent, President Gerard Swope announced a few days ago.

The orders for the December quarter amounted to $88,162,049, compared with $76,708,532 for the last quarter of 1927, an increase of 15 per cent.

More Spot * News

DEDICATION *of the new Sterlington steam plant of the Louisiana Power Company took place on Jan. 22, before a group of power officials, governors and Congressmen. The plant, largest in the central South, generates 120,000 kilowatts.*

* * *

THE FALLS OF THE OHIO *plant at Louisville, Ky., has effected an estimated saving of 25 per cent in construction costs by using a five-bladed turbine runner in each unit. These are the first ever built to this design.*

* * *

RAILWAY CARS *have been constructed in England and Germany suitable for the transportation of pulverized coal.*

* * *

A BENZ *450-hp. Diesel engine is about to be installed at the Irvington plant of the Virginia East Coast Utilities, Incorporated. This will give the plant two units, one of which will be held in reserve for emergencies.*

* * *

A SOLUTION *of ammonium chloride, hermetically sealed in containers and frozen by insertion in refrigerating brine, has been found to be far more effective than an ice-and-salt mixture in maintaining a temperature of 10 deg. F.*

* * *

LOZENGES, *according to the United States Census Bureau, cost the American public more in 1927 than the total outlay for power to haul all the trains in the country that year. Street railway power ran a poor second to candy and marshmallows. Is this a criticism of the public taste or a boost for power plant economy?*

Baltimore Starts Smoke Abatement Campaign

Members of the Baltimore Association of Commerce and approximately 100 civic, business and improvement associations recently attended a meeting to discuss the problem of smoke abatement. Dr. O. P. Hood, chief of the technologic branch, U. S. Bureau of Mines, spoke on "Practical Suggestions for Smoke Abatement."

This meeting and address were the opening guns in a campaign planned by the committee on air pollution of the Association of Commerce to acquaint Baltimoreans with the facts obtainable regarding economic losses due to air pollution, and those measures which promise relief.

Under the auspices of the committee the United States Public Health Service is beginning an atmospheric survey of Baltimore, co-operating with the city health department under Dr. Jones.

This survey is designed to collect data on the amount of material deposited from Baltimore's atmosphere, as compared with other large cities, to analyze the contents of such deposits and to determine their effects upon building and other materials and upon human health.

A.E.C. Discusses Bills at Washington Meeting

The American Engineering Council at its recent annual meeting in Washington voted to appoint a committee "to study and report to the Council on the activities and performances of the Corps of Engineers."

This action was precipitated by the opposition of the Corps to the bill providing for the establishment of a National Hydraulic Laboratory in the Bureau of Standards. The bill has passed the Senate, and is now before the Rivers and Harbors Committee of the House, where, it is charged, it is being held up by the influence of General Edgar B. Jadwin, Chief of Engineers.

The president of the Council, Arthur W. Berresford of New York, explained that the study would be in thorough accord with engineering methods, and that the Corps of Engineers would be invited to name a representative on the committee.

The Council, at the request of the American Society of Mechanical Engineers, will seek to have the number of man-hours worked in the manufacturing establishments of the United States reported in the next and succeeding censuses of manufacturers.

Several bills pending in Congress were discussed and the Council was put on record regarding them. These bills included one on patents and two on radio.

The American Institute of Consulting Engineers was elected to membership in the Council. O. H. Koch, representing the Technical Club of Dallas, and L. P. Alford of New York, representing the American Society of Mechanical Engineers, were named vice-presidents of the Council. The annual reports of the president and the executive secretary indicated that the Council was growing in influence and that 1929 promises a broader sphere of usefulness in the public service. The annual dinner of the Council was held at the Mayflower Hotel, Jan. 14. Addresses were delivered by Senator Hiram Bingham of Connecticut, and Dr. A. E. Morgan, president of Antioch College, Yellow Springs, Ohio.

Cutler-Hammer Reorganized

The incorporation is announced of a new company, Cutler-Hammer, Inc., to acquire the property, business and good will of the Cutler-Hammer Manufacturing Company. The plan involves the dissolution of the present company and its two subsidiaries, the Cutler-Hammer Manufacturing Company (of New York) and the Cream City Foundry Company (of Wisconsin).

Hydro Progress in Canada Notable During 1928

That the year 1928 was one of the greatest in the history of water-power development in Canada is disclosed in the annual review of hydro-electric progress by the Dominion Water Power and Reclamation Service. Waterwheels or turbines actually installed and brought into operation during the year totaled slightly more than 550,000 hp., bringing the total installation in the whole Dominion to 5,328,000 hp. In addition to this increase there were many large undertakings in all stages of construction, the total of which exceeds 1,200,000 hp. more. There are also many large developments in prospect, a number of which will undoubtedly be undertaken in the coming year.

During 1928 every province was represented in the year's activities, and while Quebec stood first in works of magnitude, the widespread nature of development is perhaps the most interesting and significant feature. The outstanding installations made during the year, in point of size, were: The Paugan, Quebec, development, bringing in 204,000 hp.; the Smoky Falls development, also in Quebec, which contributed 56,250 hp.; the two new units at the Great Falls station in Manitoba, adding 56,000 hp., and the new St. John River development in New Brunswick, the first unit of which is now generating 20,000 horsepower.

Portland, Ore. Plant Enlarged

Excavation has been started for the addition to the plant of the Northwestern Electric Company on the Williamette River in South Portland, Oregon, under supervision of Taylor Brothers, contractors for excavation. The new project is estimated to cost $1,200,000 and will include a new boiler unit, a new turbine-generator unit and a switching and bus structure. The addition will double the capacity of the plant when completed.

Personals

G. M. Cameron has joined Ruths Steam Storage, Incorporated, New York City, as sales engineer with headquarters at the company's main office, 292 Madison Ave., New York. Prior to this connection Mr. Cameron was associated with the Cameron Coal Company, Philadelphia, Pa.

H. B. Lindsay, formerly sales manager of the refractory products for the Norton Company, Worcester, Mass., is now doing special work as assistant to the president, C. L. Allen. The office of sales manager is now filled by Robert Kirkpatrick.

Ernest Pragst of New Orleans has been assigned by the General Electric Company to supervise the construction of new power plants and electrical equipment for the Soviet Government of Russia. The work will represent an expenditure of $25,000,000.

Carl E. Brauw, recently superintendent and electrical engineer of the Columbia River Paper Mills at Vancouver, Washington, has been made general superintendent of all Leadbetter mills.

With the Society Sections

A. S. M. E., Knoxville Regional Meeting, Mar. 21-23, 1929. Technical program and trips to points of interest.

A. S. M. E., Metropolitan Section. Meeting of the power division Feb. 4, at the Engineering Societies Building, New York City. Subject: "High Pressure Steam-Electric Generating Stations."

American Water Works Association, Montana Section. Annual convention, to be held April 4 and 5 at Great Falls, Mont.

American Water Works Association, Rocky Mountain Section. Annual meeting, to be held Feb. 14 and 15, at Denver, Colo.

Engineers' Club of St. Louis. Meeting Feb. 13, 1929. Subject: "Steam Storage and Steam Distribution," by R. A. Longworthy, vice-president and general manager of Ruths Accumulator Company.

Business Notes

Thomas E. Murray, Incorporated, has recently removed from 55 Duane St., New York City, to 88 Lexington Avenue.

The Terry Steam Turbine Company, of Hartford, Conn., announces the appointment of the Smiley Equipment Company, 202 Carmen Bldg., Kansas City, Mo., as its district representative in that territory.

The Palmer-Bee Company, of Detroit, Mich., announces the appointment of Ashley P. Peck as Chicago district representative, with offices at 937 Monadnock Bldg., that city.

The Northern Equipment Company, Erie, Pa., has appointed Bradshaw & Company, 530 Fourth Avenue, Pittsburgh, to represent the Copes System of Boiler Feed Control in the Pittsburgh District. Grant D. Bradshaw is President of this newly organized firm which is to specialize in power plant and steel mill equipment.

The Shepard Electric Crane & Hoist Company, and the Niles Crane Corporation have combined under the corporate title of the Shepard-Niles Crane & Hoist Corporation. The Shepard plant at Montour Falls, N. Y., and the Niles plant at Philadelphia, Pa., will continue in operation for the production of the types of equipment for which their facilities have been designed. The main office of the new company will be at Montour Falls.

The Acme Welded Pipe & Coil Company, of Jackson, Mich., has enlarged its welding department facilities 200 per cent by an addition to its plant. The new plant is now in operation.

Fuel Prices

COAL

The following table shows the trend of the spot steam market in various coals, f.o.b. mines; mine run, except Pittsburgh gas slack:

Bituminous (Net Tons)	Market Quoting	Price per Ton
Navy Standard...	New York.....	$2.35@$2.40
Kanawha.....	Columbus.....	$1.25@1.45
Smokeless.....	Cincinnati.....	2.25
Smokeless.....	Chicago.....	2.25
S. E. Kentucky...	Chicago.....	1.35@ 1.60
Steam.....	Pittsburgh.....	1.60@ 1.70
Gas Slack.....	Pittsburgh.....	75@ .90
Big Seam.....	Birmingham....	1.25@ 1.50
Anthracite (Gross Tons)		
Buckwheat.....	New York.....	$2.75@$3.25
Barley.....	New York.....	1.00@ 1.75

FUEL OIL

New York—Jan. 24, f.o.b. Bayonne, N. J., 28@34 deg., Baumé, industrial use, tank-car lots, 4⅜c. per gal.; 36@40 deg., furnace, tank-car lots, 6½c. per gal.

St. Louis — Jan. 16, tank-car lots, f.o.b. St. Louis, 24@26 deg., $1.40 per bbl. or 42 gal.; 26@28 deg., $1.45 per bbl.; 28@30 deg., $1.50 per bbl.; 30@32 deg., $1.55 per bbl.; 32@36 deg., gas oil, 4.6c. per gal.; 38@40 deg., distillate, 5.75c.

Pittsburgh—Jan. 15, f.o.b. local refinery, 30@34 deg., fuel oil 5c. per gal.; 36@40 deg., 5¼c. per gal.

Philadelphia—Jan. 16, 13@19 deg., $0.95@$1.02 per bbl. or 42 gal.; 22 deg. plus, $1.47@$1.53 per bbl.; 26@30 deg., $2.00@$2.06 per bbl.

Cincinnati — Jan. 15, tank-car lots, f.o.b. local refinery, 24@26 deg. Baumé, 5c. per gal.; 26@30 deg., 5½c. per gal.; 30@32 deg., 5.95c. per gal.

Chicago—Jan. 15, tank-car lots, f.o.b. Oklahoma, freight to Chicago, 90c. per bbl. or 42 gal.; 22@26 deg., 65c. per bbl.; 26@30 deg., 72½c. per bbl.; 30@32 deg., 97½c.@$1 per bbl.

Boston—Jan. 21, tank-car lots, f.o.b. 12@14 deg. Baumé, 4.5c. per gal.; 28@32 deg., 5.65c. per gal.

Dallas—Jan. 19, f.o.b. local refinery, 26@30 deg., $1.25 per bbl. or 42 gallons.

TRADE CATALOGS

AIR COMPRESSORS—From the Yeomans Brothers Company, Chicago, Ill., Bulletin No. AC-7000 is now available. This publication describes and gives tables of sizes and ratings of the new Yeomans rotary high-speed direct-connected air compressors built for pressures up to 50 lb. Numerous advantages of this new machine, such as the absence of pulsation, owing to direct connection and high speed, quiet running, and the use of the automatic oil economizer as an integral part of the unit, are enumerated.

MOTORS, GENERATORS AND STRAINERS—Three leaflets, recently issued by the Elliott Company, of Jeannette, Pa., give pictorial and descriptive material on the equipment mentioned. Motors are of the induction type, 20 to 200 hp.; generators are of the direct-current engine type; and the fuel strainers are particularly designed for the protection of Diesel engine injection valves.

FURNACE MATERIALS—The General Refractories Company, Philadelphia, Pa., has issued two leaflets, one of which deals with "Biasbrix," a type of furnace lining material made with the ends biased, and the other with silica bonding cement for various uses in connection with brickwork.

GAS BURNER—The Lee B. Mettler Company, Los Angeles, Calif., has issued a 24-page booklet illustrating and describing its entrained combustion gas burners. The publication contains many photographs, tabulated data, and a list of users of these burners.

HUMIDIFIERS—A four-page leaflet, issued by Midwest Air Filters, Inc., Bradford, Pa., describes a humidifier for use in buildings or in process work. The leaflet illustrates the apparatus and gives a general description.

POWDERED-COAL-FIRED BOILERS—The Erie City Iron Works, Erie, Pa., has issued an eight-page bulletin describing their horizontal tubular boiler for pulverized coal firing. General text and several installation illustrations, together with a diagrammatic sketch, make up the bulletin.

PORTABLE PUMPING UNIT—Bulletin No. 213, a four-page leaflet issued by the Pennsylvania Pump & Compressor Company, Easton, Pa., illustrates a gasoline engine-driven centrifugal pumping unit and an air compressor unit with truck mounting. The water pumping unit is powered by a Le Roi 8-hp. water-cooled gasoline engine. Several illustrations and a chart of pump performance are included.

OIL AND WATER TESTING APPARATUS—Eimer & Amend, New York City, have issued Bulletins 394, 400 and 406, illustrating, respectively, transformer-oil testing apparatus, an improved viscosimeter and a comparator for hydrogen ion determination. Each bulletin gives a full and careful description of the apparatus, together with application illustrations.

New Plant Construction

COMPILED BY THE MCGRAW-HILL BUSINESS NEWS DEPARTMENT, WHICH IS PREPARED TO FURNISH A MORE COMPLETE DAILY SERVICE TO THOSE WHO WISH IT

Ala., Gadsden—E. R. Price & Associates, will build a 25 ton ice plant.

Ala., Ramer—R. M. Boyd, Tuskegee, plans the construction of an ice plant here.

Ark., Hot Springs—Arkansas Power & Light Co., 411 Main St., Pine Bluff, plans the construction of a second dam and hydro-electric power plant 40,000 kw. capacity on the Quachita River near here to include two 20,000 kw. turbines, etc. Estimated cost $6,175,000. Work will be done by owners forces under the supervision of C. S. Lynch, Engr.

Ark., Hot Springs—New York Hotel Co., c/o T. K. Martin, 118 Francis St., will build a 14 story hotel at Broadway and Spring St. Estimated cost $1,000,000. Work will be done by sub-contracts under the supervision of G. R. Mann, and Wagner & King, New Donaghey Bldg., Little Rock, Archts.

Ark., Parkdale — Waterworks Improvement Dist. 1, J. K. Barnes, Chn., will soon award contract for improvements to waterworks and distribution systems including pumping equipment, tank on tower, etc.

Calif., Lodi—City plans the construction of a power plant, also transmission lines on Mokelumne River near Lancha Plana. L. F. Barzellotti, is city engineer.

Calif., Los Angeles — H. L. Arnold, awarded contract for an 11 story office building at 7th and Figueroa Sts. to J. V. McNeil Co., 5860 Avalon Blvd. Estimated cost $3,000,000. Steam heating system, elevators, etc. will be installed.

Calif., Palo Alto—City is having plans prepared for waterworks improvements, including pump house, etc. J. F. Byxbee, Jr., is city engineer.

Calif., Pasadena—Owner, c/o W. C. Folland, 631 Pacific Southwest Bank Bldg., Archt., awarded contract for a 4 story hotel at Colorado St. and De Lacy Ave. to J. Roubian, 901 Manjanita St. Estimated cost $600,000. Steam heating system, elevators, etc., will be installed.

Calif., San Francisco—Inter-City Properties Inc., c/o J. L. Stewart, Claus Spreckles Bldg., Archt. is having plans prepared for the construction of a 22 story apartment building at Cough and Sacramento Sts. Estimated cost $1,250,000.

Calif., San Francisco—Sadowsky Realty Corp., 1671 Market St., is having preliminary plans prepared for the construction of a hotel. Estimated cost $2,000,000. Clausen & Amandes, Heast Bldg., are architects.

Calif., Sacramento — Roxbury Hydraulic Mines Inc., Russ Center Bldg., San Francisco, has been granted permit for appropriation of 150 cu.ft. of water from Scott River for power and mining purposes. Estimated cost $300,000.

Calif., Suisun—City, A. N. Trainor, Clk., will receive bids until Jan. 29, for waterworks improvements including pumping plant, etc. W. Egbert, Postal Telegraph Bldg., San Francisco, is engineer.

Conn., Hartford — S. Max & Co., 38 Church St., is receiving bids for a 3 story, 30 x 150 ft. electric cold storage plant for fur storage. Estimated cost $65,000. Berenson & Moses, 30 · Allyn St., are engineers.

Conn., Mansfield—State of Connecticut, F. Salmon, Comptroller, State House, Hartford, plans the construction of a power unit, etc. at Mansfield Training school and hospital. Estimated cost $175,000.

Conn., New Haven—United Illuminating Co., 84 Temple St., will soon award contract for a 150 x 160 ft. addition to power plant on Grand Ave. Estimated cost $1,000,000. Westcott & Mapes, 139 Orange St., are engineers.

D. C., Washington — Dept. of Interior will receive bids until Jan. 31 for the construction of a nurses' home, boiler house, etc., for Freedmen's hospital.

Ill., Carbondale — City, C. Easterly, Mayor, is having tentative estimates made for the construction of a municipal electric light plant and distribution system. Estimated cost $400,000.

Ia., Clarion—Municipal Utilities Co., H. T. Cory, Genl. Mgr., will build a power and light plant. Estimated cost $100,000. Private plans. Work will be done by owner's forces.

Kan., Anthony — City will soon award contract for waterworks improvements, including wells, pump house, tank on tower, etc. Estimated cost $70,000. Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., are engineers.

Kan., Formoso—City G. B. Hale, Clk., will soon award contract for waterworks and distribution systems including 35 g.p.m. vertical turbine electrically driven pump, tank on tower, etc. Estimated cost $35,000. Shockley Engineering Co., Kansas City, Mo., is engineer.

La., New Orleans—S. Stone, Jr., Masonic Temple Bldg., Engr., is preparing plans for the construction of an ice plant on Carrolton St. Estimated cost $45,000. Owner not announced.

Minn., Wayzata — City, G. L. Mullane, Clk., plans an election Jan. 25 to vote $60,000 bonds for a complete waterworks system, including deep well, pump house, pumps, tank on tower, etc. Engineer not announced.

Minn., Minneapolis — Northern States Power Co., R. F. Pack, V. Pres. and Gen. Mgr., 15 South 5th St., plans to expend $8,000,000 for construction work in 1929. Plans include improvements to electric light and power service in Minneapolis and St. Paul, also additions and improvements to power stations and transmission lines throughout the northwest.

Miss., Houston — R. F. Brand, J. M. Gibbs, B. H. Baine and others, plan the construction of a 12 ton ice plant.

Mo., St. Louis — Bd. of Public Service, will soon award contract for the construction of a 6 story hospital including steam heating system, etc., at Park and St. Ange Sts. Estimated cost $1,200,000. L. R. Bowen and A. Osoburg, 301 City Hall, are architects. L. R. Bowen and H. Updike, 301 City Hall, are engineers.

Mo., St. Louis—Fourmen Realty Co., S. Goldstein, Pres., c/o L. F. Abrams, 1123 Chemical Bldg., Archt., plans the construction of a hotel and department store including steam heating system, etc. at Easton St. and Hamilton Ave. Estimated cost $1,000,000.

St. Louis—Corp., c/o D. S. Wenzlick, V. Pres., Wenzlick Realty Co., 1010 Chestnut St., is having preliminary plans prepared for a 37 story office building including steam heating, etc., at 11th and Chestnut Sts. Estimated cost $2,500,000.

N. J., Belleville—Bd. of Freeholders, Market and Springfield Ave., Newark, will receive bids about Feb. 15 for the construction of an 8 story hospital, nurses home, etc., including steam heating, ventilation and refrigeration systems, boilers, elevators, etc. Estimated cost $1,000,000. Sutton, Sutton & Calkins, 402 Broad St., Newark, are architects.

N. J., Elizabeth—Krumar & Burnstein, c/o W. Clifford, Jr., 293 Morris Ave., Archt., is having preliminary plans prepared for the construction of an ice plant at South 7th St. and Elizabeth River. Estimated cost $50,000.

N. J., Kearny — Mountain Ice Co., 51 Newark St., Hoboken, will build an ice plant at Lincoln and Johnson Aves. Estimated cost $40,000. F. Fink, 100 Sylvan Ave., is architect and engineer. Work will be done by separate contracts.

N. J., Montville—Jersey Central Power & Light Co., 20 South St., Asbury Park, will not construct gas generating plant here, as recently reported. This corrects report in Jan. 1 issue.

N. J., Sewaren—Public Service Electric & Gas Co., 80 Pack Pl., Newark, plans the construction of a power station north of Arthur Kill here, also electric sub-station at Van Houten and Prospect Sts., Paterson. Esimated cost $1,000,000 and $700,000 respectively. Private plans.

N. Y., Binghamton — Dept. of Mental Hygiene, Albany, will receive bids until Jan. 30 for the construction of an electric cold storage plant at Binghamton State Hospital, here.

N. Y., Brooklyn—Dept. of Mental Hygiene, Albany, will receive bids until Feb. 20 for remodeling power house and pump room, etc. at Brooklyn State Hospital, here.

N. Y., Niagara Falls—Dry Ice Corp. of America, Elizabeth, N. J., awarded contract for the construction of a 60 ton ice plant here, to H. K. Ferguson Co., Hanna Bldg., Cleveland, O. Estimated cost $250,000.

N. Y., Thiells—Dept. of Mental Hygiene, Albany, will receive bids until Feb. 20 for addition to power plant for Letchworth Village here.

Okla., Temple — Southwestern Light & Power Co., E. R. Ernsberger, Pres., 517 Braniff Bldg., Oklahoma City, plans a 20 ton ice plant here. Estimated cost $25,000.

Ore., Portland — Northeastern Electric Co., 229 Pittock Blk., plans to expend $2,225,000 for extensions and improvements to light plant. Plans include $1,250,000 for additional power unit, 20,000 kw. to Lincoln St. plant, $90,000 for starting Lewis River Washington hydro-electric plant and $700,000 for line extensions.

Ore., Portland—Pacific Power & Light Co., Gasco Bldg., plans to expend $4,000,000 for extensions and improvements to power and light plant.

Pa., Philadelphia—Aldine Trust Co., 2020 Chestnut St., will soon award contract for a 20 story bank and office building at 29th and Chestnut Sts. A. W. Hall, 15th and Locust Sts., is architect.

Pa., York — York General Hospital, awarded contract for the construction of a hospital including boiler plant, etc. to Consolidated Engineering Co., 20 East Franklin St., Baltimore, Md. Estimated cost $1,500,000.

Tex., Amarillo — City will soon award contract for improvements including pumping plant. Estimated cost $90,000. Wynkoop Diestred, 614 Interstate Bldg., Kansas City, Mo., is engineer.

Tex., Austin—City, c/o A. R. John, Mgr., awarded contract for the construction of addition to municipal water and light plant to include new power units, 7,500 kw. generator, installation of oil and gas burners, etc., to U. G. I. Contracting Co., 1401 Arch St., Philadelphia, Pa. Estimated cost $460,000.

Tex., Denton—City will soon award contract for the construction of a 45 ton ice plant. Estimated cost $50,000. B. W. McKenzie, mayor.

Tex., Donna—Hidalgo Irrigation Dist., is having surveys made for the construction of a pumping plant, etc in connection with irrigation project. Estimated cost $600,000. A. Tamm, Harlingen, is engineer.

Tex., Eagle Pass — Maverick County Water Improvement Dist. 1, plans an election Feb. 9 to vote $1,800,000 for the construction of a large power plant in conjunction with gravity irrigation project. Private plans.

Tex., Harlingen—Central Power & Light Co., c/o F. C. Ludden, Mgr., Dist. Mgr., San Benito, will build a cold storage plant here. Estimated cost $65,000. J. M. Marriott, Frost National Bank Bldg., San Antonio, is engineer. Work will be done by day labor.

Tex., Ramondville — Willacy County Control & Improvement Dist. 7, W. T. Holders, Secy., voted $7,500,000 bonds for the construction of an irrigation project including pumping plants, etc.

Ont., Ontario—Canadian Pacific Ry. Co., Montreal, Que., plans the construction of a central power plant on York St. here. Estimated cost $200,000. J. M. R. Fairbairn, Montreal, is chief engineer.

Ont., Toronto — Sproatt & Rolph, 1162 Bay St., and Ross & MacDonald, 1 Belmont St., Montreal, Que., Assoc. Archts., will soon receive bids for superstructure of second unit of department store at Yonge and College Sts., for T. Easton Co. Ltd., Queen and Yonge Sts. Estimated cost $15,000,000.

Ont., Walkerville — Walkerville Electric Commission, W. R. Wollatt, Chn., will receive bids in March for the construction of an electric sub-station on Ypres Ave. Estimated cost $60,000. Duncan B. McColl, c/o owner, is engineer.

Mexico, San Louis Potosi—Electric Bond & Share Co., 71 Broadway, New York, N. Y., is having surveys made for the construction of a hydro electric plant at Micos Falls here, also power transmission lines to Tampico, Monterey and Mexico City. Estimated cost approximately $10,000,000. Private plans.

Equipment Wanted

Boiler—G. Turpeinen, 770 Aqueduct St., Montreal, Que., is in the market for a 6¾ hp. steam boiler.

Boiler and Equipment — Hinde-Dauch Paper Box Co., Muncie, Ind., plans to purchase boiler and other equipment to replace equipment destroyed in explosion.

Boilers, etc.—Jantzen Knitting Co., 695 Sandy St., Portland, Ore., is in the market for boilers and electrical driven spinning machines for proposed 2 story, 130 x 230 ft. factory. Estimated cost $500,000.

Boilers, Turbine, etc.—Dept. of Health, Indianapolis, Ind., three 500 hp. boilers, 250 kw. unaflow unit, 350 kw. turbine unit, etc., for proposed power plant at Indianapolis City Hospital. Estimated cost $450,000.

Electric Sub-Station Equipment — Walkerville Electric Commission, W. R. Wollatt, Chn., Walkerville, Ont., is in the market for equipment for proposed electric power plant.

Motors, Etc.—Dolomite Products Co., Penfield, N. Y., plans the installation of motors for proposed crushing plant. Estimated cost $500,000.

Pump and Motor — Dept. of Public Works, S. E. O'Brien, Secy., Ottawa, Ont., will receive bids until Feb. 12 for the installation of an additional pump and motor complete in each of two caissons at Esquimalt Graving Dock, Nanaimo Dist., B. C.

Pumping Unit — Bd. of Commissioners, City Hall, Newark, N. J., plans the installation of an additional pumping unit in sewage treatment work. Estimated cost $100,000.

Pumps — East Side Levee & Sanitary Dist., 213 Metropolitan Bldg., East St. Louis, Ill., will receive bids until Feb. 20, for four 54 in. and two 36 in. screw pumps with auxiliary equipment for proposed pumping stations.

Pumps, etc.—Bureau of Yards & Docks, Navy Dept., Washington, D. C., pumps, etc., at Naval Proving Ground, Dahlgren, Va.

Turbine, Generator, Etc.—Dept. of Interior, Bureau of Reclamation, Denver, Colo., will receive bids until Feb. 26 for 1,200 hp. vertical hydraulic turbine, one 1,000 kva. a.c. generator, switchboard, etc., for Pilot Butte power plant, Riverton Project, Wyoming.

Turbine—City of Portland, Ind., plans to purchase turbine for electric light plant. Estimated cost $20,000.

Industrial Projects

Calif., Torrance — CEMENT PLANT — Hercules Portland Cement Co., c/o H. H. Helbush & Co., 2300 Wilshire Blvd., Los Angeles, Agts., is having plans prepared for the construction of a cement plant including machine shop, packing plant, etc. Estimated cost $3,500,000. Private plans.

Calif., South San Francisco — STEEL FACTORY ADDITIONS — Pacific Coast Steel Co., Hunter-Dulin Bldg., awarded contract for addition to plant including 3 story, 100 x 450 ft. bolt and nut plant, 150 x 880 ft. machine shop, to Pacific Coast Engineering Co., 938 23rd Ave., Oakland. Estimated cost $600,000.

Ind., South Bend—FACTORY and BOILER HOUSE—Bendix Brake Co. awarded general contract for the construction of a 79 x 80 ft. factory and boiler house at 401 Bendix Dr. Estimated cost $46,000.

Mich., Detroit—AIRPORT and POWER HOUSE—Dept. of Public Works, will soon award contract for 1 story, 108 x 1,750 ft. airport and power house, etc. at Gratiot and Connors Ave. Estimated cost $1,000,000. L. Kamper Inc., Cass Ave., is architect. P. A. Fellows, City Hall, is engineer.

Mich., Detroit—PRODUCE TERMINAL —Detroit Union Produce Terminal Co., F. Isbey, Chn., 142 12th St., is having plans prepared for a 1 and 2 story produce terminal including loading docks, etc. on West Fort St. Estimated cost $5,000,000. R. W. Mohr, Railway Exchange Bldg., St. Louis, Mo., is architect.

Mich., Detroit—TRAILER FACTORY—Fruehoff Trailer Co., 10940 Harper Ave., will soon award contract for a 1 story, 155 x 160 ft. factory on Mack Ave. A. Kahn, 1000 Marquette Bldg., is architect. Electric motors and miscellaneous equipment for assembly of heavy truck trailers will be required.

Mich., Flint — ENGINE PARTS FACTORY — Marvel Carburetor Co., 1910 St. John St., awarded contract for a 1 story, 140 x 175 ft. engine parts factory, to W. E. Wood Co., 1805 Ford Bldg., Detroit. Estimated cost $50,000. Electric motors, etc., will be installed.

Mich., Jackson — HEAT TREATING PLANT—American Gear & Mfg. Co., Park Ave., awarded contract for a 1 story, 60 x 300 ft. heat treating plant to Everett Winters, 1651 East Grand Blvd. Estimated cost $140,000. Electric motors and heat treating ovens will be installed.

Mich., Muskegon Heights — AUTOMOBILE PARTS FACTORY—Pyle Pattern & Mfg. Corp. awarded contract for a 2 story 40 x 125 ft. factory on Sanford St. to George Lather & Sons, Irwin St., Muskegon. Estimated cost $40,000. Steam heating, electric motors and equipment for making metal patterns and light factory work for automobile parts will be installed.

N. J., Newark — MILK DEPOT — Schaeffer Milk Co., 51 East Bigelow St., will build a milk depot including electric refrigeration system, etc., at 105-107 West Peddir St. Estimated cost $40,000. S. Cohen, 634 Branford Pl., is architect. Work will be done by separate contracts.

O., Canton—DAIRY MACHINERY FACTORY—Arctic Ice Machine Co., 920 Market Ave. S., plans the construction of a 1 story factory. Estimated cost $100,000.

Pa., Pittsburg—CORRUGATED PAPER BOX FACTORY—F. J. Kress Box Co., 2930 Liberty Ave., awarded contract for a 1 story, 240x406 ft. factory at 28th and Railroad Sts. to Austin Co., 16112 Euclid Ave., Cleveland, O. Estimated cost $300,000.

Tex., Lubbock — PRODUCE and CREAMERY PLANT—Western Produce Co., c/o J. B. White, Abilene and R. White, Lubbock, is receiving bids for a 2 story produce and creamery to include refrigeration system, two 80 hp. boilers, etc. Estimated cost $175,000. Private plans. Machinery and equipment will be required.

Tex., Sweetwtaer — REFINERY — Gulf Refining Co., Gulf Bldg., Houston, plans the construction of a refinery here. Estimated cost $2,500,000. Private plans.

Ont., Ford City—AUTOMOBILE BODY PLANT and BOILER PLANT—Servel Inc., Hercules Products Div., awarded contract for a 1 story, 60 x 150 ft. plant including detached boiler plant to Hoffman Construction Co., 7143 West Warren Ave. Estimated cost $75,000.